KELCO

F25 CORROSION RESISTANT FLOW SWITCHES

FEATURES

- RELIABLE ROBUST CONSTRUCTION
- WEATHERPROOF ENCLOSURE IP56
- ALL WETTED PARTS IN THERMO PLASTIC
- NO METAL PARTS IN CONTACT WITH FLUIDS
- FULLY ADJUSTABLE FLOW SENSITIVITY
- SUITS PIPE SIZES 25MM TO 150MM +
- REED SWITCH OR SOLID STATE RELAY OUTPUT
- TOTALLY SERVICEABLE DESIGN
- FULL 18 BAR (260 PSI) PRESSURE RATING
- ENERGY AUTHORITY APPROVED

APPLICATIONS

- Loss of flow protection for pumps
- Control of flow in ultra pure water systems
- Flow status signalling in water treatment plants
- Control of effluent and fluid neutralising systems
- Corrosive and saline ground water applications
- Applications involving sea water or brine solutions
- Safety and control signalling for chemical handling
- Control and protection of chemical pumps
- Irrigation and turf watering systems control
- Horticultural and hydroponics system control



The F25 series flow switch has been specifically developed to fill the need for a flow sensor, capable of working reliably in applications in which metal flow switches fail. Typical areas include chemical, process, pharmaceutical, scientific and agricultural uses in which the metal components of traditional flow switches either interfere with, or are attacked by, the liquids being handled.

Modern thermo plastic pipe systems are used extensively in agriculture, industry, and in commercial and domestic fluid handling. The F25 flow switch has been specifically designed to integrate into plastic piping systems, and to enhance the advantages of such systems. Total avoidance of metal components, in the fluid stream, has been achieved. In addition, an advanced frictionless sensitivity adjusting system gives total external control over the switching threshold.

AUSTRALIAN MADE

TECHNICAL DATA

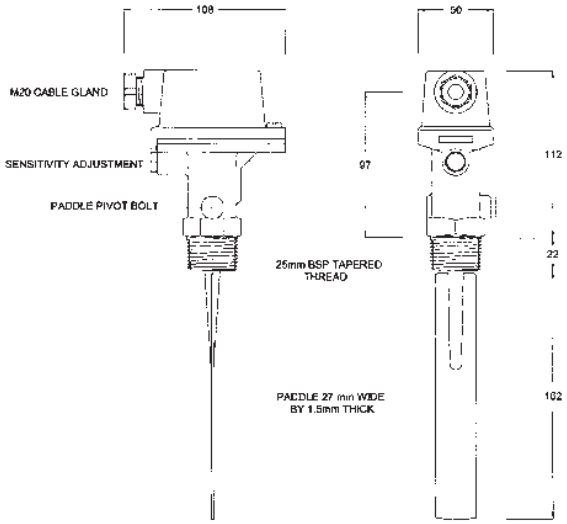
CONSTRUCTION

The F25 series flow switch is made from glass reinforced polypropylene.

Polypropylene is non-ageing and is unaffected by ground conditions. It will not support algae or bacterial growth, and has exceptional resistance to most acids, alkalis and solvents.

The F25 series flow switch should not be used with organic solvents.

DIMENSIONS



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.

Switch Model	Module Type	Contact Configuration	Switched Power	Switched Voltage Maximum	Switched Current Resistive AC (rms) Maximum	Inductive Loads (Power Factor 0.4)	Typical Application
F25-B	Dry Reed Switch	S.P.S.T. N.O/N.C.	40W	240V AC 200V DC	1A	Not Suitable	PLC & control circuits
F25-C	Dry Reed Switch	S.P.D.T.	40W	240V AC 200V DC	1A	Not Suitable	PLC & control circuits
F25-R	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
F25-A-240	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
F25-A-24	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

The circuit boards fitted to the F25-B and the F25-R switches are supplied as normally off switches that turn on when flow starts. Turning the circuit board end for end will reverse this standard switch function. Circuit boards with S.P.D.T. contacts, such as the F25-C and the boards that include built in relays, should not be reversed. Normally on and normally off functions are available directly from the terminal blocks of these switches.

Data on maximum and minimum flow rates needed to actuate F25 flow switches is not included. Pipe size, paddle arm trimming and sensitivity settings all interact to determine the switching thresholds. The unique magnetic system employed in the Ultraswitch F25 series provides a range of settings unequalled - covering extreme sensitivity to very low flows through to relative insensitivity to quite high flow rates.

OPERATING ENVIRONMENT

Maximum Operating Pressure (Static or Dynamic) at Ambient Temperature	1800 Kpa 260 P.S.I.
Minimum Burst Pressure at Ambient Temperature	7000 Kpa 1000-P.S.I.
Maximum Operating Temperature	80 Degrees C at a pressure 1 bar absolute, see note below
Minimum Operating Temperature	-20°C
Ph Range Standard Switch	1 to 14

Note: Switching point flow rate date given in the table above refers to water at 15°C as the process fluid. In the interest of safety, maximum operating pressure given in the operating parameters table must be de-rated linearity in direct proportion to temperature increase, to a maximum pressure of 1 bar absolute at 80 degrees Centigrade. In other words only use this switch at elevated temperatures in non pressurised systems that are totally open to atmosphere in all circumstances and under all conditions.

NEW SOUTH WALES DEPARTMENT OF MINERALS AND ENERGY APPROVAL No. CS4937N

KELCO

F26 SERIES CORROSION RESISTANT HEAVY DUTY FLOW SWITCHES

FEATURES

- POLYPROPYLENE OR STAINLESS CONSTRUCTION
- 15 OR 20 AMP 500V S.P.D.T. SWITCH
- SUITS PIPE SIZES 25mm AND ABOVE
- 18 OR 100 BAR PRESSURE RATING
- WEATHERPROOF IP67 HOUSING
- SEAL LESS MAGNETIC DRIVE
- MANUAL OVERRIDE BUILT IN
- FULLY ADJUSTABLE



The F26 heavy-duty flow switch is a highly sensitive paddle style switch suitable for a wide range of process control applications in cold to warm liquids. The switch is designed to integrate into modern thermoplastic piping systems, and to compliment the inherent advantages of such systems.

The F26 flow switch is available in two basic forms, a general purpose polypropylene model designated F26-S, which is suitable for most control circuit applications and for the direct control of low wattage pump motors. The second version, model F26-H is supplied with a 20Amp 500Volt switch suitable for directly controlling heaters, fans or pump motors up to 1.5kW 2HP. Both versions of the switch are available in either Polypropylene thermoplastic or Polypropylene and 316 stainless steel construction. All F26 flow switches are supplied with an extra long paddle designed to be custom cut and shaped to suit the specific installation.

A unique feature of all the F26 flow switches is a built-in manual override switch that allows the flow switch to be turned on, regardless of lack of flow. This feature means pumps can be manually started or primed directly from the flow switch, it also facilitates the testing and commissioning of systems.

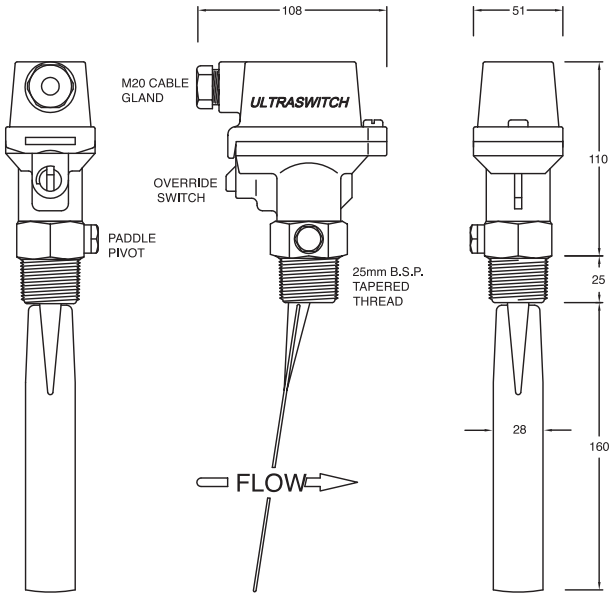
Our unique magnetic repulsion system is built into each F26 flow switch and couples the paddle's movement to the high compliance switch through a wall of solid polypropylene or stainless steel. The result is a flow switch with no seals or bellows or other points of potential failure. Where required, the F26 flow switch can be supplied with no metal parts in contact with the process liquid. The F26 flow switch can be used reliably in a huge variety of liquids including sea water, bore water, acids, alkalis and in many chemical solutions.



AUSTRALIAN MADE

TECHNICAL DATA

DIMENSIONS



MODELS AVAILABLE

F26-S	Standard polypropylene flow switch with 15Amp 500Volt SPDT switch 18 Bar pressure rated.
F26-SS	316 Stainless & polypropylene model with 15Amp 500Volt SPDT switch 100 Bar pressure rated.
F26-H	Polypropylene heavy-duty model with 20Amp 500Volt SPDT switch 18 Bar pressure rated.
F26-HS	316 Stainless & polypropylene model with 20Amp 500Volt SPDT switch 100 Bar pressure rated.

OPERATING ENVIRONMENT

MODEL	**F26-S, & F26-H** (all Polypropylene construction)	**F26-SS & F26-HS** (316 Stainless & Polypropylene construction)
Maximum operating pressure (static or dynamic) at ambient temperature.	18 Bars (260 PSI)	100 Bars (1450 PSI)
Minimum burst pressure at ambient temperature.	80 Bars (1160 PSI)	400 Bars (5800 PSI)
Maximum operating temperature (Liquid)	80 Degrees C at a pressure 1 bar absolute, see note below	80˚ C
Minimum operating temperature (Liquid)	-30˚ C	-30˚ C
Process liquid Ph range	1 to 14	1 to 14
Ingress protection rating (Weatherproof rating)	IP67 Watertight to 300mm submergence	IP67 Watertight to 300mm submergence

Note: temperature for the maximum operating pressure shown in the above operating environment table is 15°C, In the interest of safety, when using the polypropylene version of the F26 series, maximum operating pressure must be de-rated linearly in direct proportion to temperature increase, to a maximum pressure of 1 bar absolute at 80 degrees Centigrade. In other words only use this switch at elevated temperatures in non pressurised systems that are totally open to atmosphere in all circumstances and under all conditions.

FLOW SENSITIVITY

The accompanying table gives the flow in litres per minute required to actuate the F26 flow switch when installed in Schedule 40 Steel Pipe of various diameters. The flow rates given refer to water as the process liquid. In the case of 25NB and 32NB pipe, the paddles are trimmed to clear the inside wall of the pipe by 3mm. For all other pipe diameters the switch is fitted with a standard width paddle that has been trimmed to the centre line of the pipe. The data is accurate to +/-15% in a non-turbulent flow installation; with 5 diameters of straight pipe either side of the switch.

The accompanying table should be used as a general guide only. Increasing the paddle length will proportionally increase the sensitivity of the switch. That is, it will decrease the flow rate required to actuate the flow switch. Inversely, decreasing the paddle length will reduce the sensitivity of the switch and increase the flow rate required to actuate the switch. Maximum recommended flow rates are determined by setting a safe limit to the flow induced forces acting on the paddle.

Under the conditions described above the maximum flow rates should not exceed 5 times the switching point flow rates given in the table. Proportionally reducing the paddle length can substantially increase the safe maximum flow rate, but at a low flow will also increase the flow rate required to actuate the flow switch.

ELECTRICAL DATA

The F26-S and the F26-SS models are suitable for general control circuit applications

MODELS F26-S AND F26-SS								
Rated Voltage	NON INDUCTIVE LOADS				INDUCTIVE LOADS			
	Resistive load		Lamp Load		Inductive Load		Motor Load	
	NC	NO	NC	NO	NC	NO	NC	NO
125 VAC	15A		3 A	1.5 A	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	0.75A
8 VDC	15A		3 A	1.5 A	15A		5A	2.5A
14 VDC	15A		3 A	1.5 A	10A		5A	2.5A
30 VDC	6A		3 A	1.5 A	5A		5A	2.5A
125 VDC	0.5A		0.5 A	0.5 A	0.05A		0.05A	0.05A
250 VDC	0.25A		0.25 A	0.25 A	0.03A		0.03A	0.03A

The F26-H and the F26-HS models are suitable for the direct control of pump motors up to 1.5kW 2HP.

MODELS F26-H AND F26-HS								
Rated Voltage	NON INDUCTIVE LOADS				INDUCTIVE LOADS			
	Resistive load		Lamp Load		Inductive Load		Motor Load	
	NC	NO	NC	NO	NC	NO	NC	NO
125 VAC	20A		7.5A		20A		12.5A	
250 VAC	20A		7.5A		20A		8.3A	
500 VAC	15 A		4A		10A		2A	
8 VDC	20A		3 A	1.5 A	20A		12.5A	
14 VDC	20A		3 A	1.5 A	15 A		12.5A	
30 VDC	6 A		3 A	1.5 A	5 A		5 A	
125 VDC	0.5 A		0.5 A		0.05 A		0.05 A	
250 VDC	0.25 A		0.25 A		0.03 A		0.03 A	

KELCO

F27 TIME DELAY FLOW SWITCH

FEATURES

- DRY RUN PROTECTION FOR PRESSURE SYSTEMS
- DRY RUN PROTECTION FOR BORE PUMPS
- DIRECTLY CONTROL PUMPS TO 3.75kW 5HP
- INBUILT START-UP TIMER
- AUTOMATIC RUN-ON TIMER
- NO METAL PARTS IN CONTACT WITH LIQUIDS
- 240V, 24VAC AND DC MODELS AVAILABLE
- INDICATOR LED's FOR ALL FUNCTIONS
- RELIABLE PROVEN CONSTRUCTION
- WEATHERPROOF ENCLOSURE
- SUITS PIPES 25mm AND ABOVE
- 18 BAR (260 PSI) PRESSURE RATING
- STAINLESS MODELS AVAILABLE

GENERAL DESCRIPTION

The F27 time delay flow switches are paddle flow switches with built-in digital timers that override the off state of the flow switch and allow a pump to start in spite of an initial lack of flow. They also have adjustable run-on timers that let the pump ignore minor flow interruptions while still being fully protected against running dry.

DRY RUN PROTECTION FOR STANDARD PRESSURE SYSTEMS

If a normal pressure system operated by a pressure switch is run dry, severe damage to the pump and its seal may result. An F27 flow switch connected between the pressure switch and the pump will protect the pump from dry run damage by shutting it down, in spite of the pressure switch trying to keep it running.

CONSTRUCTION

The F27 flow switches have no metal parts in contact with liquids. They operate through a seal-less magnetic coupling system, and are therefore ideally suited to use in aggressive or saline ground water, seawater or chlorinated water.

The F27 is made from a high tech blend of ABS, and Polypropylene thermoplastics, specifically tailored to give the highest possible performance in terms of mechanical strength, ultraviolet stability, and chemical inertness. All the F27 flow switches use our well proven magnetic suspension system, to give a frictionless spring return action to the paddle, and total isolation of the electronic module. The electronics built into the F27 are both brown-out and voltage surge protected.

INSTALLATION

The F27 pump controller should be mounted in a straight section of the pump's discharge pipe, either before or after the air cell. A 1"BSP female thread must be provided to fit the controller. The F27 is supplied with an extra long paddle to allow it to be installed in large pipes for industrial or irrigation use. The paddle is normally cut down to suit the specific pipe into which the controller is to be installed.

BASIC MODE

With both its start-up and run-on timers set to zero, the F27 mimics the action of a basic flow switch. It simply turns on and off in direct response to flow. The start-up override and run-on functions are ignored.

OVERRIDE ON START

When powered up, the F27 turns on the pump and lets it run for a settable time in spite of a lack of initial flow. It expects to see its paddle pushed into the on position by flow during the start-up time. If flow is not established by the end of the set time period the F27 shuts down the pump and prevents it from running dry. The override on start time is adjustable in 16 steps from 1 second to 3 minutes. Normally a time setting of a few seconds is all that is required to start a pump. The extra long start-up time settings can be used to start submersible bore pumps with self-draining risers and in any situation where a long delay in flow stabilisation may be encountered.

IGNORE PADDLE BOUNCE

The F27 has an adjustable run-on function so that minor fluctuations in flow don't cause the pump to instantly stop. The run-on function is adjustable in 16 steps from 1 second to 5 minutes. A setting of a few seconds run-on is all that is normally needed to ignore minor flow interruptions, such as air bubbles in the pipework. The extra long run-on feature can be used to allow the pump to pressurise high volume piping systems, to charge large air cells or to pump down low yield bores at very low flow rates.



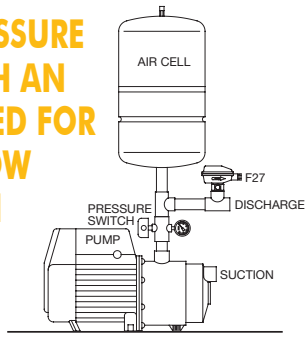


Run-on Timer Control
Start-up Timer Control
Paddle LED
Timer LED

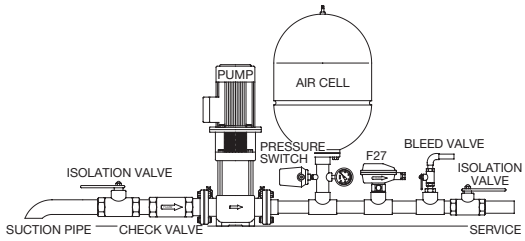
AUSTRALIAN MADE

TECHNICAL DATA

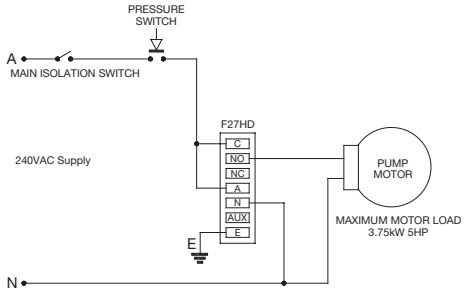
TYPICAL PRESSURE SYSTEM WITH AN F27 INCLUDED FOR LOSS OF FLOW PROTECTION



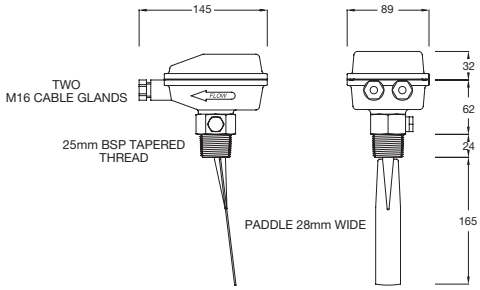
TYPICAL RURAL OR INDUSTRIAL PUMP INSTALLATION



CIRCUIT FOR A STANDARD PRESSURE SYSTEM CONTROLLED BY AN F27



DIMENSIONS



MODELS

Part Number	Maximum 240VAC Motor Load	Supply Required	Contact Type	Typical Application	Output Type	Output can drive timers or small relays
F27-240HD	3.75kW 5HP	140mA at 240VAC	S.P.D.T.	Control of pump motors to 5HP	Hybrid Solid State Drive	NO
F27-24HD	3.75kW 5HP	140mA at 240VAC	S.P.D.T.	Control of pump motors to 5HP	Hybrid Solid State Drive	NO
F27-240	0.75kW 1HP	140mA at 240VAC	S.P.D.T.	Control of pump motors to 1HP	Mechanical Relay	YES
F27-24	0.75kW 1HP	140mA at 24VAC	S.P.D.T.	Control of pump motors to 1HP	Mechanical Relay	YES
F27-DC	0.75kW 1HP (AC Motors Only)	140mA at 12 to 24VDC	S.P.D.T.	Control of pump motors to 1HP	Mechanical Relay	YES

OPTIONS

316 Stainless steel body with 100 Bar pressure rating
1" NPT Male Polypropylene process connection
Trailing Wire Flow Sensor for effluent applications

SPECIFICATIONS

Microprocessor digital control.
Fully independent control over both the start-up and run-on timers.
Start-up timer adjustable from 0 to 180 seconds in 16 steps.
Run-on timer adjustable from 0 to 300 seconds in 16 steps.
True paddle status LED, turns green in direct response to flow.
Power indication LED slowly blinks red to indicate when the F27 is powered up and in standby mode.
Timer LED turns green to indicate when the start-up timer is running.
Timer LED turns red to indicate when the run-on timer is running.
Output to drive the pump, Hybrid Drive or Relay.
One set of normally closed 16 Amp contacts are also provided to operate an external alarm or warning light, to indicate the pump has stopped.
The F27 flow switch has both brown-out and voltage surge protection built in.
Magnetic paddle adjustment for flow sensitivity.
Two M16 cable glands in the controller's housing accept 8mm flex or two M16 conduit connections, to bring power to the F27 and to run a cable to the pump.
Maximum operating pressure, static or dynamic, standard models, 18Bars (260 PSI), or 100Bars (1400PSI) for the optional stainless steel models.
Maximum liquid temperature 70ºC All models.
Minimum liquid temperature –20ºC All models.
Liquid Ph 1 to 14.
Weatherproof rating IP56 (Hose proof).

KELCO

F30 PUMP CONTROLLER

CAPABLE OF DIRECTLY CONTROLLING PUMPS UP TO 3.75Kw 5HP, THE F30 IS A VERSATILE CONTROLLER THAT INTEGRATES FLOW AND PRESSURE. IT BRINGS THE ADVANTAGES OF CONSTANT FLOW AND DRY RUN PROTECTION TO TRADITIONAL PRESSURE SYSTEMS.

INTRODUCTION

The F30 Pump Controller is a microprocessor based electronic flow switch that monitors both flow and pressure. When included in a pressure system it vastly improves overall performance and gives the benefit of both constant flow and dry run protection.

Pressure systems cycle between low and high pressure, not because this gives the user any advantage but simply because a pressure differential is required to operate the pressure switch that normally controls such pumps. The user sees the effect as fluctuations in pressure at the tap. If loss of prime occurs, a pump controlled by a pressure switch will run the pump dry and can cause major damage.

THE F30 CONTROLLER

The F30 Pump Controller offers a far better approach. The pump starts on either flow or pressure drop, as soon as there is a modest demand. When demand ceases the controller continues to run the pump for a length of time, sufficient to recharge the system's air cell. Such a system allows the selection of a pump that has a flat curve and delivers a steady constant pressure over widely varying flows. An air cell with a very small draw-off can be used; as there only has to be sufficient stored pressure to re-actuate the F30 controller the next time there is a demand. With the F30 system the external pressure switch is set to start the pump at a pressure only marginally higher than the system's static pressure. If the demand is too low to actuate the F30's paddle, or if for any reason the pressure falls, eventually the pressure switch will close and signal the F30 to start the pump. The F30 then runs the pump for a preset time, recharges the air cell, switches to standby mode and waits for a further demand.

DRY RUN PROTECTION

A pump running under the control of an F30 will start if the pressure drops, or if a tap is turned on. If the system runs out of water the F30 senses the loss of flow and the lack of pressure and stops the pump. A red warning light on the controller then flashes rapidly to indicate there is a problem. The pump will not restart until the power to the pump is reset.

CONSTRUCTION

The F30 controllers have no metal parts in contact with liquids. They operate magnetically through a seal-less magnetic coupling system. They are therefore ideally suited to use in aggressive or saline ground water, in seawater or chlorinated water and in a huge variety of chemical solutions, including most acids and alkalis. The F30 is made from a high tech blend of Polypropylene and ABS thermoplastic, specifically tailored to give the highest possible performance, in terms of mechanical strength, ultraviolet stability, and chemical inertness.

INSTALLATION

The F30 pump controller should be mounted in a straight section of the pump's discharge pipe, either before or after the air cell. A 1"BSP female thread must be provided to fit the controller. The F30 is supplied with an extra long paddle to allow it to be installed in large pipes for industrial or irrigation use. The paddle is normally cut down to suit the specific pipe into which the controller is to be installed.



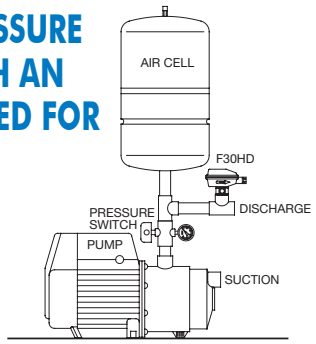


Run-on Timer Control
Start-up Timer Control
Pressure switch LED
Paddle and Alarm LED
Timer LED

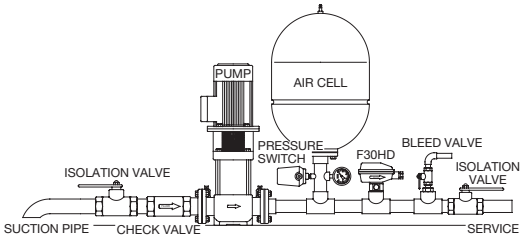
AUSTRALIAN MADE

TECHNICAL DATA

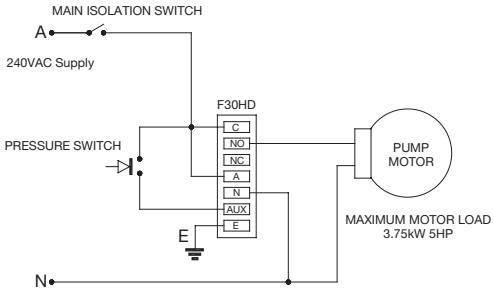
TYPICAL PRESSURE SYSTEM WITH AN F30 INSTALLED FOR PROTECTION



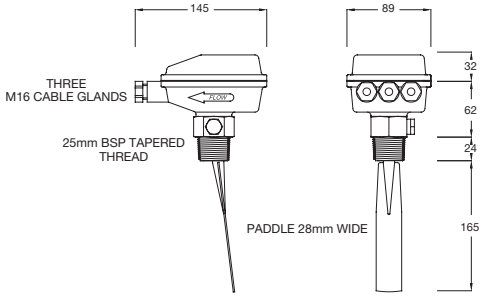
LAYOUT OF A LARGE RURAL OR INDUSTRIAL PUMPING SYSTEM



BASIC PRESSURE SYSTEM WIRING DIAGRAM



DIMENSIONS



MODELS

Part Number	Maximum 240VAC Motor Load	Supply Required	Contact Type	Typical Application	Output Type	Suitable for general control circuit applications
F30-240HD	3.75kW 5HP	150mA at 240VAC	S.P.D.T.	Control of pump motors to 5HP	Hybrid Solid State Drive	NO
F30-24HD	3.75kW 5HP	150mA at 240VAC	S.P.D.T.	Control of pump motors to 5HP	Hybrid Solid State Drive	NO
F30-240	0.75kW 1HP	150mA at 240VAC	S.P.D.T.	Control of pump motors to 1HP	Mechanical Relay	YES
F30-24	0.75kW 1HP	150mA at 24VAC	S.P.D.T.	Control of pump motors to 1HP	Mechanical Relay	YES
F30-DC	0.75kW 1HP (AC Motors Only)	150mA at 12 to 24VDC	S.P.D.T.	Control of pump motors to 1HP	Mechanical Relay	YES

OPTIONS

316 Stainless steel high pressure body
1”NPT Male process connection
Trailing Wire Sensor for effluent applications

SPECIFICATIONS

Microprocessor digital control.
Pressure switch input. Allows connection of external pressure switch.
Indicator LED shows when the pressure is high or low.
Fully independent control over both the start-up and run-on timers.
Start-up timer adjustable from 0 to 180 seconds.
Run-on timer adjustable from 0 to 300 seconds.
True paddle status LED, turns on and off in response to flow.
Power indication LED blinks to indicate the F30HD is powered up.
Timer LED indicates the start-up timer is running.
Dry run LED flashes to indicate the pump has run dry and shut down.
Timer LED indicates the run-on timer is running.
Output to drive pump is via a Solid State Hybrid Drive or Relay.
Brown-out and voltage surge protection built-in.
Magnetic paddle adjustment for flow sensitivity.
Three M16 cable glands in the controller’s housing accept 8mm flex or three M16 conduit connections.
Maximum operating pressure, static or dynamic, standard models 18 Bars (260 PSI). 316 Stainless steel model 100Bars (1400 PSI).
Maximum liquid temperature 70ºC.
Minimum liquid temperature –20ºC.
Liquid Ph 1 to 14, Standard Polypropylene models.
Maximum ambient temperature 45ºC.
Weatherproof rating, housing IP56 Hose-proof.

KELCO

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.

AUSTRALIAN MADE

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

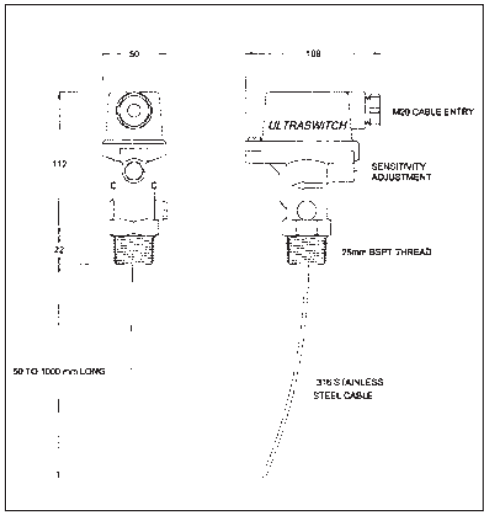
It is not possible to give definitive data on the actual flow rates required to actuate the switch. Every installation is unique, and many factors interact to determine exactly how the sensor will perform. Depending very much on wire length and submergence, a minimum liquid velocity of around 0.2 metres 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

KELCO

TW26 SERIES TRAILING WIRE FLOW SWITCHES

FEATURES

- UNIQUE TRAILING WIRE SENSOR
- 18 OR 100 BAR PRESSURE RATING
- POWERFUL 15A 500V SPDT SWITCH
- SUITS OPEN CHANNELS OR PIPEWORK
- CORROSION RESISTANT BODY
- WEATHERPROOF IP67 HOUSING

APPLICATIONS

- HIGH VELOCITY FLOW SENSING
- SEWERAGE PUMP CONTROL
- SLURRY PUMP FLOW MONITORING
- PUMP DRY RUN PROTECTION
- DATA LOGGING EFFLUENT FLOWS
- OPEN CHANNEL DATA ACQUISITION
- CONVEYOR BELT SOLIDS DETECTION



AUSTRALIAN MADE



INTRODUCTION

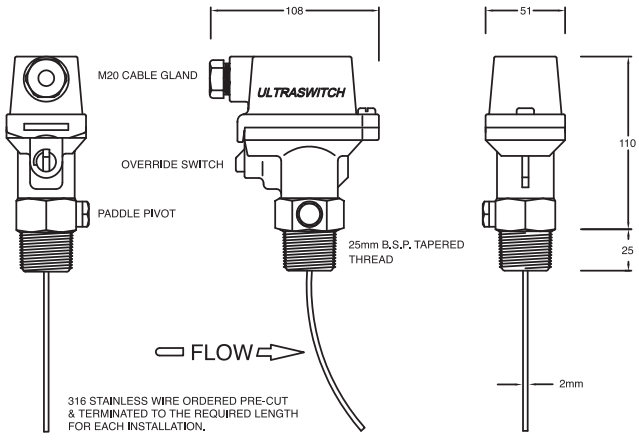
The TW26-S and TW26-SS trailing wire flow switches are heavy duty flow sensors that use a flexible stainless wire rather than a conventional paddle to sense fluid flow. They are suitable for sensing flow in open discharge applications or in pipes of any diameter from 25mm upwards. The flexible stainless wire sensor offers major advantages over conventional paddles when used in situations where solids or semi-solids are present, such as in sewerage pumping applications. They are also suitable for use in slurry and mining applications and in many normal pumping situations where the flow velocity is high and conventional paddles are unsuitable.

The TW26 trailing wire flow switch is available in two models, an all Polypropylene version, designated TW26-S and an Poypropylene / 316 stainless steel model TW26-SS. Both models are identical with the exception of the stainless body. The standard all Polypropylene switch is suitable for most applications where static or dynamic pressures are less than 18 Bars. The stainless version can safely tolerate pressures to 100 Bars. The TW26-SS has the advantage of higher mechanical strength and finds application in fire prone or vandal prone areas.

CONSTRUCTION

The TW26 series flow switches are made from premium grade polypropylene thermoplastic, and 316 stainless steel. The electrical action within the switch is achieved by the use of powerful rare earth magnets coupling the movement of the trailing wire to the high compliance switch. This mechanism avoids the use of bellows, seals or springs and ensures the switch operates with a very high degree of reliability.

DIMENSIONS



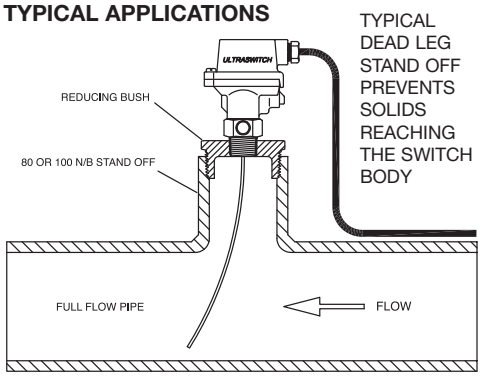
TECHNICAL DATA

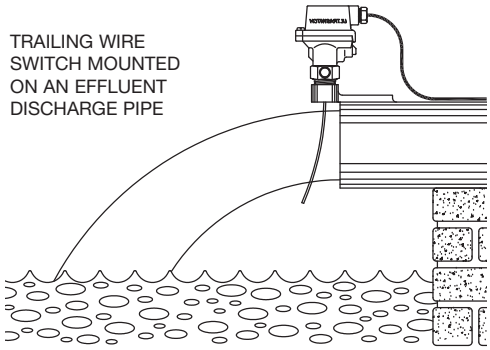
APPLICATIONS

It is not possible to give definitive data on the actual flow rates required to actuate the TW26 flow switch. Every installation is unique and many factors interact to influence exactly how the sensor will respond. A minimum force acting on the flexible wire of 0.4N (40 grams) is required to actuate the switch. Depending very much on wire length and submergence, a minimum fluid velocity of around 0.2 to 0.4 Metres per second is generally required to reliably actuate the switch. In low flow situations the cross section of the channel or pipe can be reduced to increase the local velocity sufficient to actuate the TW26 switch. The degree of submergence of the trailing wire and the distance from the liquid surface to the switch, the viscosity and amount and nature of any entrained matter in the fluid stream will also affect the switch's action.

The TW26 flow 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 principle 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 fluid flows. Equally the switch can be screwed through an inspection cover, with the flexible wire trailing into a partly filled pipe.

TYPICAL APPLICATIONS





OPERATING ENVIRONMENT

Maximum operating pressure (static or dynamic) at ambient temperature.	20 Bars (290 PSI) polypropylene model 100 Bars (1450 PSI) 316 Stainless model
Minimum burst pressure at ambient temperature.	80 Bars (1160 PSI) polypropylene model 400 Bars (5800 PSI) 316 Stainless model
Maximum operating temperature (Liquid)	80 Degrees C at a pressure 1 bar absolute, see note below
Minimum operating temperature (Liquid)	-30°C
Process liquid Ph range	6.8 to 14
Ingress protection rating (Housing)	IP67

Note: Temperature for the maximum operating pressure shown in the above operating environment table is 15°C, In the interest of safety, when using the polypropylene version of the TW26 series, maximum operating pressure must be de-rated linearly in direct proportion to temperature increase, to a maximum pressure of 1 bar absolute at 80 degrees Centigrade. In other words only use this switch at elevated temperatures in non pressurised systems that are totally open to atmosphere in all circumstances and under all conditions.

SPECIFYING SWITCHES

Our factory can supply switches configured to specific requirements. The trailing wire is normally supplied cut to the required length. The free end of the flexible wire is TIG welded to prevent fraying. Wire lengths range from 25mm to 500mm.

When ordering TW26 flow switches, please nominate the required wire length or the size of the pipe in which the switch is to be installed. For example the following part number would define the basic all Polypropylene switch with a flexible wire length of 100mm. TW26-S-100. A 100 Bar pressure rated switch with an Polypropylene / 316 stainless body suitable for mounting in a 200mm diameter pipe would be defined as TW26-SS-200.

MANUAL OVERRIDE

The TW26 trailing wire flow switch has a built in manual override, located under the cable gland on the end face of the switch. The rotary toggle switch is marked AUTO and ON. In the AUTO position the flow switch responds solely to flow, and the toggle switch has no effect. In the ON position the flow switch is actuated regardless of the state of the actual flow, that is, the switch is turned on. The override feature is handy for testing new installations, commissioning systems and for manually priming pumps or starting diesel pump sets etc.

ELECTRICAL DATA

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.

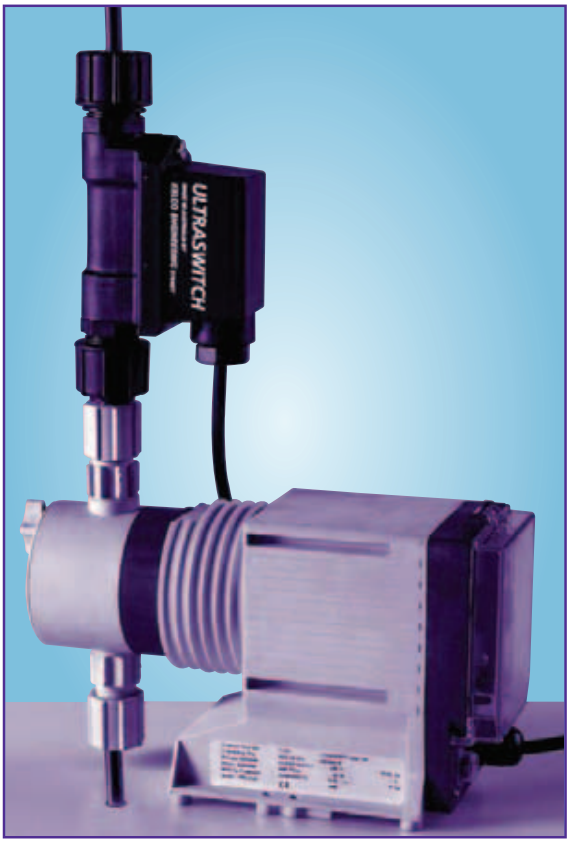
The TW26 flow switch houses a magnetically coupled high current high voltage single pole double throw microswitch. The standard TW26 flow switch is fitted with a 15Amp 500Volt switch suitable for most general control circuit applications. The accompanying table gives the electrical rating of the switch.

The TW26-S and the TW26-SS models are suitable for general control circuit applications.

Rated Voltage	NON INDUCTIVE LOADS				INDUCTIVE LOADS			
	Resistive load		Lamp Load		Inductive Load		Motor Load	
	NC	NO	NC	NO	NC	NO	NC	NO
125 VAC	15A		3 A	1.5 A	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	0.75A
8 VDC	15A		3 A	1.5 A	15A		5A	2.5A
14 VDC	15A		3 A	1.5 A	10A		5A	2.5A
30 VDC	6A		3 A	1.5 A	5A		5A	2.5A
125 VDC	0.5A		0.5 A	0.5 A	0.05A		0.05A	0.05A
250 VDC	0.25A		0.25 A	0.25 A	0.03A		0.03A	0.03A

KELCO

MF20 MICRO FLOW SWITCHES



FEATURES

- DETECTS FLOWS OF LESS THAN 350mL /Hour
- SUITS TUBES & PIPES 6 to 20mm (1/4" to 3/4") DIA.
- NO METAL PARTS IN CONTACT WITH LIQUIDS
- SUITS PULSED OR CONTINUOUS FLOWS
- 18 BAR (260 PSI) PRESSURE RATING
- STABLE ELECTRICAL RESPONSE
- VERY HIGH FLOW THROUGH
- MANY OPTIONS AVAILABLE
- VERY LOW HEAD LOSS
- VERTICAL MOUNTING
- EASY TO INSTALL

APPLICATIONS

- CONTROL FOR BACKUP DOSING PUMPS
- CHEMICAL METERING PUMP CONTROL
- CHEMICAL INJECTION POINT STATUS
- VAPOUR & GAS FLOW DETECTION
- LABORATORY APPLICATIONS
- LOSS OF PRIME DETECTION
- BATCH CONTROL

DESCRIPTION

The MF20 micro flow switch is a super sensitive version of our popular P20 in line flow switch. The MF20 is a very simple and reliable mechanical flow switch that can detect extremely low flows; the switch can detect either continuous or pulsed flows. Typical applications include monitoring chemical metering pumps to ensure they are delivering flow, in water treatment, cooling towers and in a multitude of industrial processes. The MF20 flow switch gives a simple on or off response to liquid flow. There are no metal parts in contact with liquids within the switch, so the MF20 is ideal for use in aggressive media such as acids and alkalis and many chemical solutions. The standard switch is supplied complete with tube flare fittings, for 3 popular tube sizes, and a set of pipe spigots and unions, for direct fitting into 15NB PVC or ABS pipe work. In addition, a number of electrical options are available. These include electrical modules with single and multiple reed switches, relays with various coil voltages, and solid-state switches.

OPERATING PRINCIPLE

The body of the MF20 flow switch houses a fluted piston. Any flow, either pulsed or continuous, causes the piston to be lifted up within the switch body to a point where the liquid can pass over the piston and out of the top of the switch. The piston contains a magnet that actuates a reed switch and this provides the switching output. When flow stops, the piston sinks due to gravity, thus moving the magnet within away from the reed switch. No metal parts are in contact with the process liquid, and the simple gravity return system provides an exceptionally reliable corrosion proof mechanism. The sensitivity of the flow switch is determined by the viscosity of the fluid and by the clearance between the piston and the switch body. Three pistons are supplied with each MF20 flow switch, with accurate and predictable switch points ranging from 0.32 litres per hour to 12.8 litres per hour. The MF20 flow switch must be mounted vertically with flow upward through the switch body. The switch can be mounted directly on the suction or discharge valve of a metering pump.

CONSTRUCTION

The Micro flow MF20 flow switch is made from glass-reinforced polypropylene with EPDM O-ring seals and PVC spigots. These are the only materials that come in contact with liquids passing through the switch. A high power rare earth magnet operating through the solid body of the switch actuates the MF20 electrically. The electrical housing is weatherproof to IP67, and is supplied with an integral 20mm cable gland, for conduit or cable entry. The electrical circuit boards used in the switch are interchangeable, and all of the parts of the MF20 flow switch are available as spare parts.

AUSTRALIAN MADE

TECHNICAL DATA

FLOW SENSITIVITY AND RESPONSE TIME

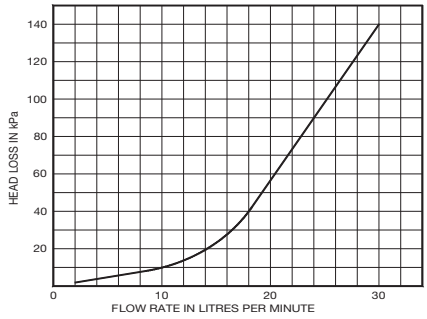
Sensitivity to fluid flow is a function of liquid viscosity and piston clearance. There are 3 pistons available to suit the MF20 flow switch. Each piston has a distinct switching point. The pistons are designated and marked A, B and C. The "A" piston is fitted to the MF20 flow switch as standard. The optional "B" and "C" pistons are also supplied packed in with each switch. The following table sets out the performance parameters of the 3 pistons. The data is based on testing with water at 15˚C as the test medium, and is accurate to +/-10%. Changes in liquid viscosity or temperature will affect the switching point. Increases in viscosity will proportionally decrease the flow rate required to actuate the switch, and will proportionally increase the response time. Decreasing viscosity will proportionally increase the flow required to actuate the switch, and will proportionally decrease the response time.

Note: In pulsed flow applications where no pulse dampener is installed, and the pulse frequency is less than the electrical response time, the MF20 flow switch may respond with a train of on / off pulses rather than with a continuous on signal.

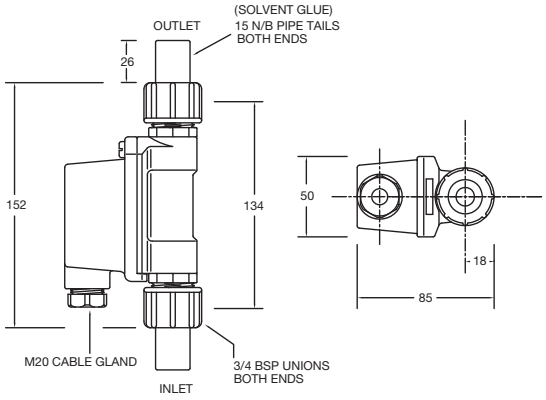
Piston Markings and Designation	Switching Point . on a Rising Flow in Litres per Hour	Switching Point . on a Reducing Flow in Litres Per Hour	Electrical Response Time in Seconds on Cessation of Flow
A	**0.32**	**0.30**	**4**
B	**3.10**	**3.05**	**3**
C	**12.80**	**12.6**	**2**

Please Note: The type "A "piston is supplied as standard fitted to each switch, unless otherwise specified. The B & C pistons are included packed in with each switch.

The graph shows the dynamic head loss across the MF20 flow switches. The data refers to water at 15˚C as the test medium.



DIMENSIONS



OPERATING ENVIRONMENT

Maximum Recommended Operating Pressure (Static or Dynamic) at Ambient Temperature	1800 kPa (260 P.S.I.)
Minimum Burst Pressure at Ambient Temperature	9700 kPa (1400 P.S.I.)
Maximum Liquid Temperature (Standard MF20 Switch)	80 Degrees C at a pressure 1 bar absolute, see note below
Minimum Liquid Temperature (Standard MF20 Switch)	-30˚C
Maximum Recommended Continuous Flow Rate (Water)	25 Litres per Minute (Head loss across the switch <100kPa at 25L/min)
Liquid Ph range	1 to14
Ingress Protection Rating (Weatherproof Rating)	IP67

Note: Temperature for the maximum operating pressure shown in the above operating environment table is 15°C, In the interest of safety, maximum operating pressure must be de-rated linearly in direct proportion to temperature increase, to a maximum pressure of 1 bar absolute at 80 degrees Centigrade. In other words only use this switch at elevated temperatures in non pressurised systems that are totally open to atmosphere in all circumstances and under all conditions.

ELECTRICAL DATA

The MF20 in line flow switch is available in a variety of electrical configurations, to suit specific applications. The model numbers and details of these options are outlined in the table below.

Switch Model	Module Type	Contact Configuration	Switched Power Maximum	Switched Voltage Maximum	Switched Current Resistive AC (rms) Maximum	Inductive Loads (Power Factor 0.4)	Typical Application
MF20-B	Dry Reed Switch	S.P.S.T. N.O	40W	240V AC 200V DC	1A	Not Suitable	PLC and General Control Circuits
MF20-C	Dry Reed Switch	S.P.D.T.	40W	240V AC 200V DC	1A	Not Suitable	PLC and General Control Circuits
MF20-R	Solid State Relay (Triac)	S.P.S.T. N.O	750W	2 to 240V AC	4A Continuous (Spike to 16A)	4A at 240V AC	AC Control Circuits and AC Motor Control to1 HP
MF20-A240	Standard Relay 240V AC Coil	S.P.D.T.	2500VA at 250VAC 300VA at 30VDC	0 to 240 V AC	10A	7.5A at 240V AC 5A at 30V DC	General AC or DC Control
MF20-A24	Standard Relay 24V AC Coil	S.P.D.T.	2500VA at 250VAC 300VA at 30VDC	0 to 240V AC	10A	7.5A at 240V AC 5A at 30V DC	General AC or DC Control

Note: The MF20 flow switch uses reed switches as the primary switching element. Reed switches are one of the most reliable mechanical switching 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 or if applied in questionable applications, suitable protection should be added to the control circuit.

KELCO

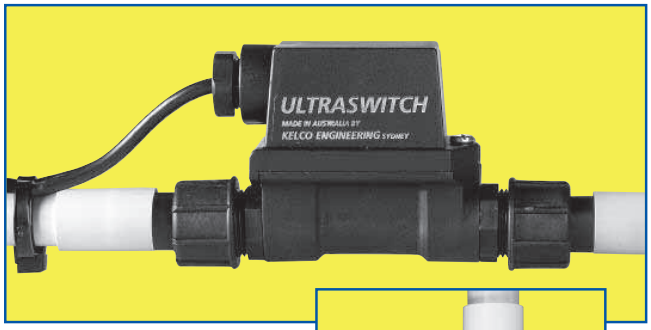
P20 CORROSION RESISTANT IN LINE FLOW SWITCHES



Magnetically sprung piston provides exceptional reliability

FEATURES

- SUITS TUBES & PIPES 6 TO 20 MM (¼" TO ¾") DIA.
- NO METAL PARTS IN CONTACT WITH LIQUIDS
- ALL POSITION MOUNTING
- CHOICE OF 3 SWITCHING FLOW RATES
- DETECTS VERY LOW FLOWS
- ROBUST RELIABLE SWITCH
- EASY TO INSTALL
- HIGH FLOW THROUGH
- 18 BAR (260 PSI) PRESSURE RATING
- VERY LOW HEAD LOSS
- MANY OPTIONS AVAILABLE



HORIZONTAL MOUNTING



VERTICAL MOUNTING

APPLICATIONS

- Liquid or gas flow detection
- Constant pressure pump control
- Loss of prime pump protection
- Water treatment contol
- Industrial process control
- Irrigation control
- Chemical dosing systems
- Chilled water control
- Vapour flow detection



AUSTRALIAN MADE

GENERAL INFORMATION

DESCRIPTION

The P20 In line Flow Switch is a simple and reliable flow switch that can detect the flow of liquids or gases in tubes and small diameter pipes. The P20 can detect either continuous or pulsed flows. Typical applications include monitoring flow in water treatment and irrigation systems, domestic constant pressure system control, gland cooling systems and a myriad of uses in industrial process control. The P20 flow switch gives a simple on or off response to liquid flow. There are no metal parts in contact with liquids within the switch, so the P20 is ideal for use in aggressive liquids such as seawater, groundwater, acids and many chemical solutions. The standard switch is supplied complete with pipe spigots and unions, for direct fitting into PVC or ABS pipe work. In addition 5 electrical modules are available that give a wide choice of control options. These include electrical modules with single and multiple reed switches, relays with various coil voltages, and solid-state switches. Each P20 flow switch is supplied complete with 3 pistons, to provide the user with a wide choice of flow switching points.

OPERATING PRINCIPLE

The body of the P20 flow switch houses a fluted piston. Any flow, either pulsed or continuous, causes the piston to be pushed back within the switch body to a point where the liquid can pass over the piston and out of the switch. The piston contains a magnet that actuates a reed switch and this provides the switching output. When flow stops, the piston is pushed back to the off position by a second magnet built into the switch body. No metal parts are in contact with the process liquid, and the magnetically sprung piston provides an exceptionally reliable corrosion proof mechanism. The sensitivity of the flow switch and its switching point are determined by the viscosity of the fluid and by the clearance between the piston and the switch body. The P20 flow switch can be mounted in any orientation in pipe-work, including upside down, with no adverse effects.

CONSTRUCTION

The standard P20 flow switch is made entirely from glass reinforced polypropylene, with neoprene O-ring seals. The piston return mechanism and the electrical switching action within the switch are achieved using high power magnets operating through the solid body of the switch. The electrical housing is hose-proof & weatherproof, and is supplied with a built in 20mm cable gland, for conduit or flexible cable entry. The electrical circuit boards used in the switch are interchangeable, and all of the parts of the P20 flow switch are available as spare parts.

OPTIONS

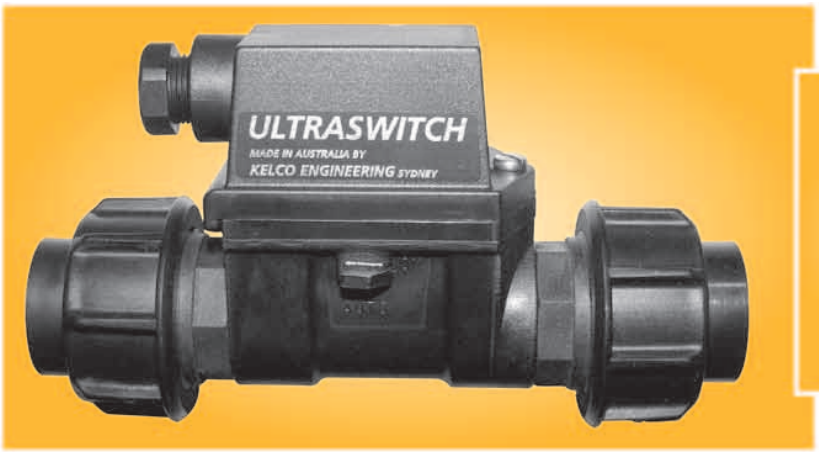
In addition to a choice of 5 standard circuit boards to suit the P20 flow switch; the user also has the following options.

Each P20 flow switch is supplied complete with 3 pistons. By simply changing pistons the user has the choice of 3 switching points, 140 millilitres per minute, 570 millilitres per minute or 1.70 Litres per minute. In addition, for OEM applications, switches can be ordered pre-set to any required switching point from one Litre per hour to 4 Litres per minute. Contact your supplier for details.

The standard P20 flow switch is supplied complete with inlet and outlet pipe connections with 20mm (3/4 BSP) male threads and unions. Pipe spigots in 15 nominal size are also included. In addition, the P20 flow switch can also be ordered with optional 25mm (1” BSP) unions and 20mm (3/4”) nominal size spigots, in PVC.

KELCO

P25 SERIES CORROSION RESISTANT HEAVY DUTY INLINE FLOW SWITCHES





FEATURES

- DIRECTLY SWITCH PUMP MOTORS TO 1.5kW 2HP
- NO METAL PARTS IN CONTACT WITH LIQUIDS
- SUITS PIPE FROM 15mm to 25mm (1/2" to 1") DIA.
- 100 LITRES PER MINUTE FLOW RATING
- VERSATILE ALL POSITION MOUNTING
- 18 BAR (260 PSI) PRESSURE RATING
- IP67 WEATHERPROOF HOUSING
- DETECTS VERY LOW FLOWS
- MANUAL OVERRIDE BUILT IN
- ADJUSTABLE SWITCH POINT

APPLICATIONS

- LOSS OF PRIME PROTECTION FOR PUMPS
- CONSTANT PRESSURE PUMP CONTROL
- CONTROL OF TANK FILLING SYSTEMS
- LOW YIELD BORE PUMP PROTECTION
- WATER TREATMENT MONITORING
- INDUSTRIAL PROCESS CONTROL
- METERING PUMP CONTROL
- MECHANICAL SERVICES
- IRRIGATION CONTROL



AUSTRALIAN MADE

DESCRIPTION

The P25 Inline flow switch is a rugged flow actuated sensor that can detect the flow of liquids in 15mm (1/2") to 25mm (1") diameter pipes. The switch can detect very low flows yet has a low head loss high flow through rating. It can be used to sense either continuous or pulsed flows. The P25 finds a myriad of applications in industrial, rural and domestic piping systems. It is particularly well suited to pressure boosting applications and in the control of constant pressure pumps, due to its ability to detect and switch at extremely low flows. In addition the P25 finds application in the protection of low yield bore pumps, and in remote tank filling systems. There are no metal parts in contact with liquids within the switch, so it is ideal for use in aggressive liquids such as groundwater, seawater, acids and in many chemical solutions.

The standard switch is supplied complete with pipe sockets and unions, for direct fitting into PVC, ABS or Poly pipework. The heart of the P25 flow switch is a 500Volt 20Amp single pole double throw switch with Tungsten contacts capable of directly controlling single-phase pump motors up to 2 Horse Power 1.5kW. A manual override switch is built into the body of every P25 flow switch. This feature allows pumping systems to be manually activated at any time for normal starting or for priming testing or commissioning.

OPERATING PRINCIPLE

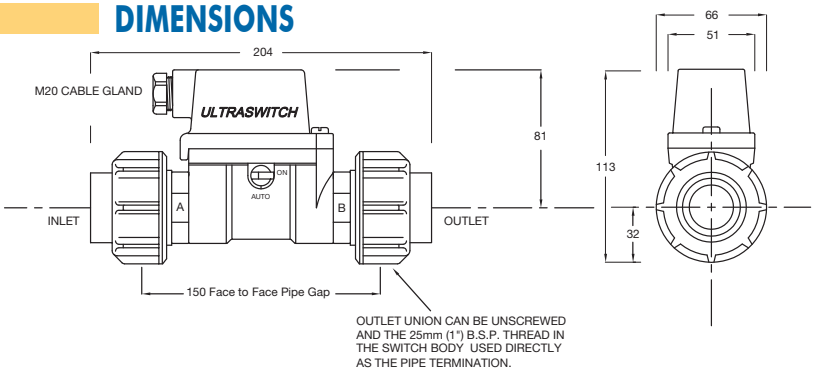
The body of the P25 flow switch houses a free fitting piston. Any flow, either pulsed or continuous, causes the piston to be pushed back within the switch body to a point where liquid can pass around it and out of the switch. When pushed back by flow, the piston actuates a magnetically linked switch. When flow stops, the piston is pushed back to the off position by magnetic repulsion. There are no springs or metal parts in contact with the process liquid, and the magnetically isolated piston provides an exceptionally reliable corrosion proof mechanism. The sensitivity and set point of the P25 flow switch is adjustable over two overlapping flow ranges, by interchanging the inlet and outlet fittings on the switch. For fine tuning the switching point, a set screw located in the switch housing is provided.

TECHNICAL DATA

CONSTRUCTION

The standard P25 flow switch is made from glass reinforced polypropylene, with neoprene o-ring seals. The piston return mechanism and the electrical switching action within the sensor are achieved using high power magnets operating through the solid body of the switch. The electrical housing is hoseproof & weatherproof to IP67, and is supplied with a 20mm cable gland, for conduit or cable entry. All of the parts of the P25 flow switch are available as spare parts.

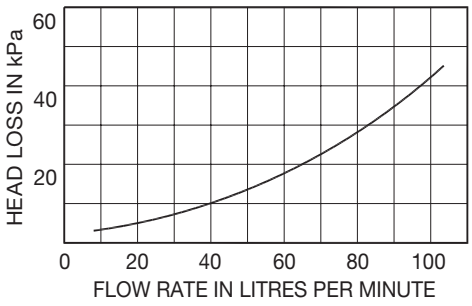
DIMENSIONS



MODELS AVAILABLE

Model	Description
P25-15	Switch supplied with 25mm Unions and 15NB PVC pipe sockets
P25-20	Switch supplied with 32mm Unions and 20NB PVC pipe sockets
P25-25	Switch supplied with 40mm Unions and 25NB PVC pipe sockets

Flow rate verses differential head loss for the P25 flow switch.



OPERATING PARAMETERS

Switching Point on a Slowly Rising Flow +/- 15%.	**A** Range Adjustable from 0.8 Litres per Minute to 5.3 L/min. **B** Range Adjustable from 2.2L/min. to 10L/min.
Switching Point on a Slowly Falling Flow +/-15%.	Approximately 20% less than the rising flow switching rate in both the **A** and **B** ranges..
Minimum Gravity Head Required to Actuate the P25 Switch	**A** or **B** Range at Maximum Sensitivity, 1.4 Metres,
Maximum Recommended Continuous Flow Rate	100 Litres per Minute (Head loss across the switch<50kPa at 100 L/min.)
Maximum Recommended Operating Pressure (Static or Dynamic) at Ambient Temperature	1800 kPa (260 P.S.I.)
Minimum Burst Pressure at Ambient Temperature	6000 kPa (865 P.S.I.)
Maximum Liquid Temperature (Standard P25 Switch)	80 Degrees C at a pressure 1 bar absolute, see note below
Minimum Liquid Temperature (Standard P25 Switch)	-30˚C
Liquid Ph range	1 to14
Ingress Protection Rating (Weatherproof Rating)	IP67

Note: Switching point flow rate date given in the table above refers to water at 15°C as the process fluid. In the interest of safety, maximum operating pressure given in the operating parameters table must be de-rated linearity in direct proportion to temperature increase, to a maximum pressure of 1 bar absolute at 80 degrees Centigrade. In other words only use this switch at elevated temperatures in non pressurised systems that are totally open to atmosphere in all circumstances and under all conditions.

ELECTRICAL DATA

The P25 flow switch houses a high capacity single pole double throw microswitch suitable for most general control applications and for the direct control of pump motors up to 1.5kW 2HP.

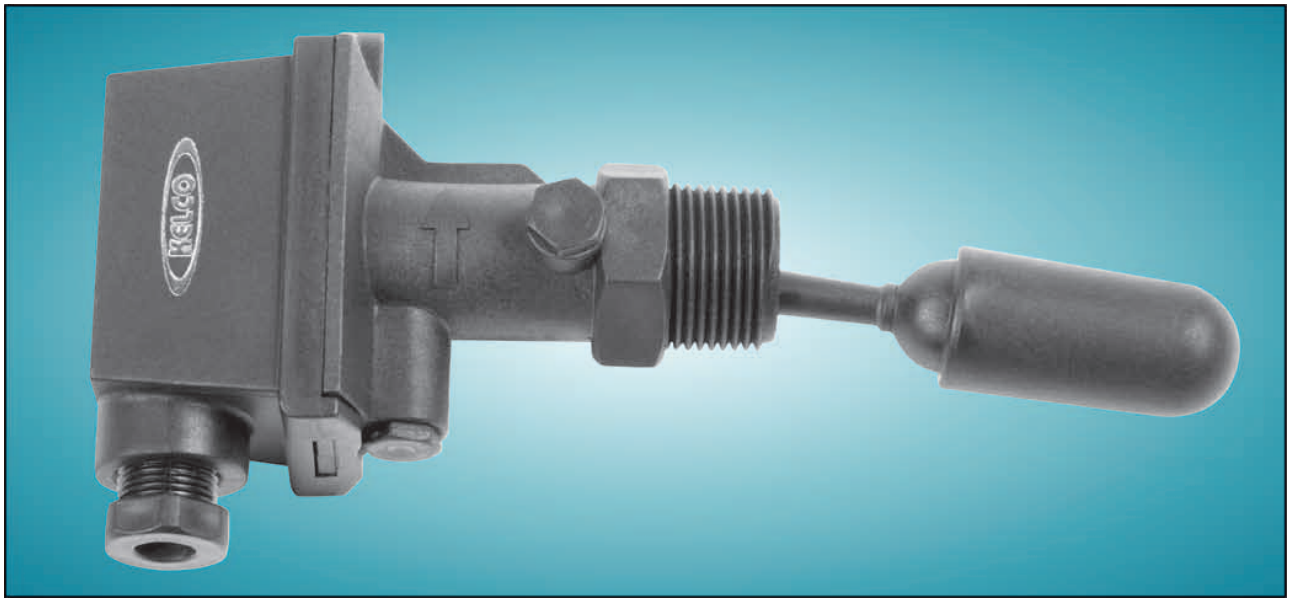
Rated Voltage	NON INDUCTIVE LOADS				INDUCTIVE LOADS			
	Resistive Load		Lamp Load		Inductive Load		Motor Load	
	NC	NO	NC	NO	NC	NO	NC	NO
125 VAC	20A		7.5A		20A		12.5A	
250 VAC	20A		7.5A		20A		8.3A	
500 VAC	15 A		4A		10A		2A	
8 VDC	20A		3 A	1.5 A	20A		12.5A	
14 VDC	20A		3 A	1.5 A	15 A		12.5A	
30 VDC	6 A		3 A	1.5 A	5 A		5 A	
125 VDC	0.5 A		0.5 A		0.05 A		0.05 A	
250 VDC	0.25 A		0.25 A		0.03 A		0.03 A	

KELCO

L25 CORROSION RESISTANT LEVEL SWITCHES

FEATURES

- RELIABLE ROBUST CONSTRUCTION
- WEATHERPROOF ENCLOSURE IP56
- ALL WETTED PARTS IN POLYPROPYLENE
- NO METAL PARTS IN CONTACT WITH FLUIDS
- FULLY ADJUSTABLE LEVEL SENSITIVITY
- SIMPLE TO INSTALL AND ADJUST
- REED SWITCH OR SOLID STATE RELAY OUTPUT
- TOTALLY SERVICEABLE DESIGN
- ENERGY AUTHORITY APPROVED



APPLICATIONS

- Low level protection for pumps
- Control and signalling in ultra pure water systems
- Tank level status signalling in water treatment plants
- Control of levels in effluent and fluid neutralising systems
- Applications involving sea water or brine solutions
- Safety and control signalling for chemical handling
- Control and protection of chemical pumps

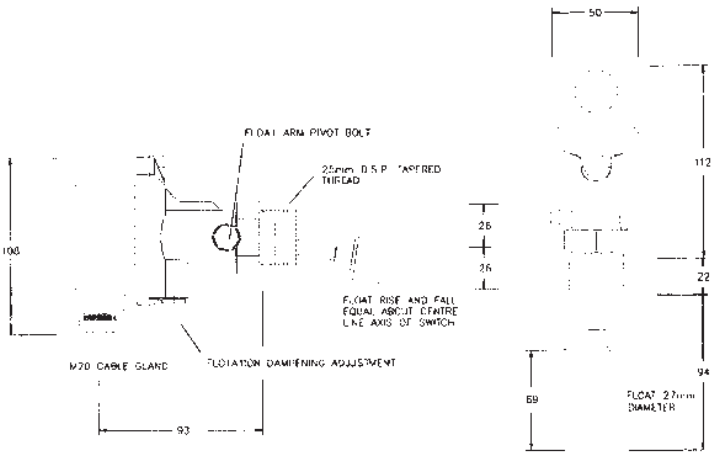
AUSTRALIAN MADE

TECHNICAL DATA

The L25 series level switch has been specifically developed to fill the need for a level sensor, capable of working reliably in applications in which metal level switches fail. Typical areas include chemical, process, pharmaceutical, scientific and agricultural uses, in which the metal components of traditional level switches either interfere with, or are attacked by, the liquids being handled.

Modern plastic and fibreglass tank systems are used extensively in agriculture, industry, and in commercial and domestic fluid handling. The L25 level switch has been specifically designed to integrate into plastic and fibreglass tank systems, and to enhance the advantages of such systems. Total avoidance of metal components, in contact with the liquid, has been achieved. In addition, an advanced frictionless sensitivity adjusting system gives total external control over the switching threshold.

DIMENSION SKETCH



ELECTRICAL DATA

Switch Model	Electrical Module	Switched Power in Watts Maximum	Switched Voltage AC(r.m.s.) Maximum	Switched Current Resistive AC(r.m.s.) Maximum	Maximum Starting Current Inductive Loads	Motors or Other Inductive Loads
L25-B	Dry Contact Reed switch S.P.S.T.	40W	250V	1A	-	-
L25-C	Dry Contact Reed Switch S.P.D.T.	40W	250 V	1A	-	-
L25-R	Solid State Relay output S.P.S.T.	750W	250V	5.2A	100A	1HP 0.75 Kw Maximum

CONSTRUCTION

The L25 series level switches are made from glass reinforced polypropylene.

Polypropylene is non-ageing and is unaffected by ground conditions. It will not support algae or bacterial growth, and has exceptional resistance to most acids, alkalis and solvents. The L25 series level switch should not be used with oxidizing acids or chlorinated organic solvents.

L25 series level switches are intended to be mounted horizontally, in a 25mm B.S.P. socket in the side of tanks. As supplied by the factory, the L25 level switch will give an off condition when the float arm is down, or not being lifted by liquid. The on state will occur when the float is raised by liquid level. This electrical function may be reversed by turning the switch electrical module end for end. Thus an on state will occur when the liquid level drops and the float is lowered.

OPERATING ENVIRONMENT

Maximum Operating Pressure (Static or Dynamic) at Ambient Temperature	1800 Kpa 260 P.S.I.
Minimum Burst Pressure at Ambient Temperature	7000 Kpa 1000-P.S.I.
Maximum Operating Temperature	80 Degrees C at a pressure 1 bar absolute, see note below
Minimum Operating Temperature	-20°C
Ph Range Standard Switch	1 to 10
Ph Range with ABS Arm	1 to 14

NOTE: Temperature for the maximum operating pressure shown in the above operating environment table is 15°C, In the interest of safety, when using the L25 series, maximum operating pressure must be de-rated linearly in direct proportion to temperature increase, to a maximum pressure of 1 bar absolute at 80 degrees Centigrade. In other words only use this switch at elevated temperatures in non pressurised systems that are totally open to atmosphere in all circumstances and under all conditions.

NEW SOUTH WALES DEPARTMENT OF MINERALS AND ENERGY APPROVAL No. CS4937N

KELCO

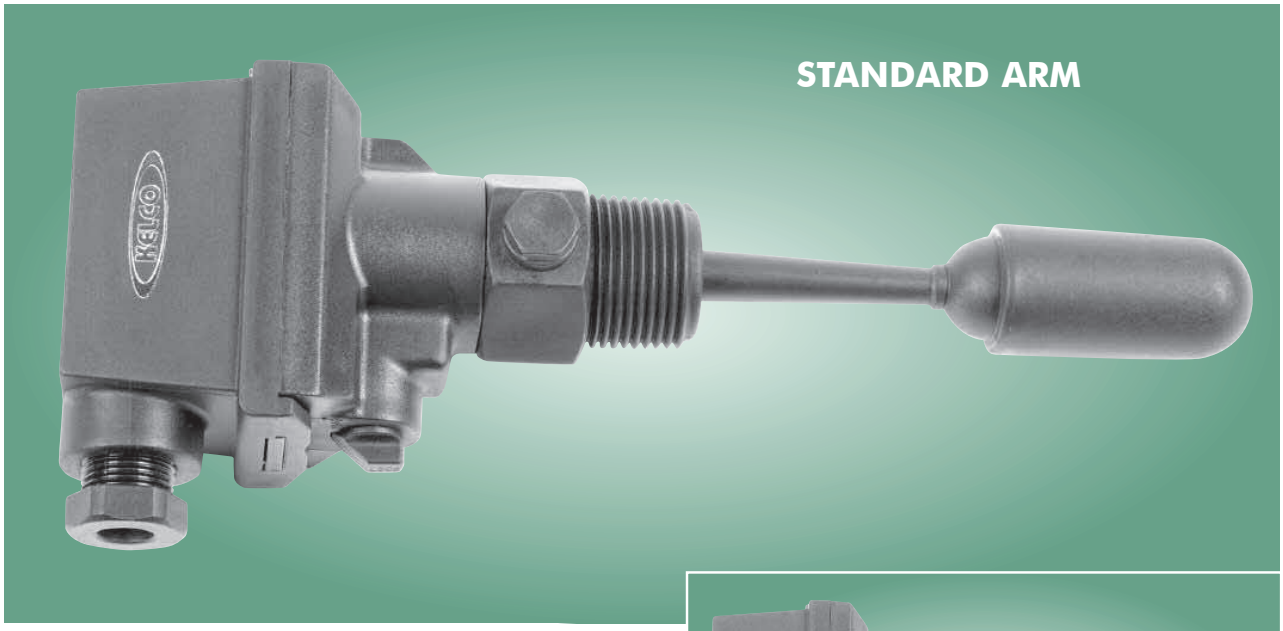
L26 SERIES HEAVY DUTY LEVEL SWITCHES

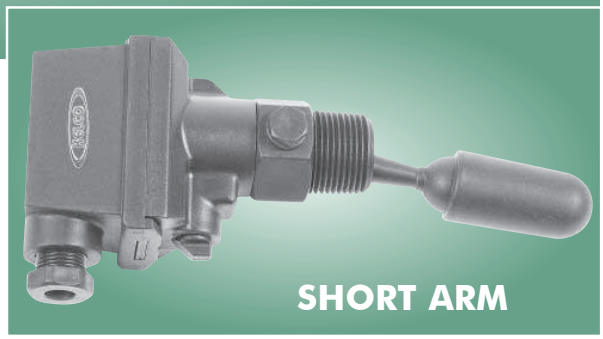
FEATURES

- STAINLESS STEEL OR POLYPROPYLENE BODY
- BUILT IN MANUAL OVERRIDE SWITCH
- RELIABLE PROVEN DESIGN
- 15 AMP 500VOLT SPDT SWITCH
- UNIQUE SEAL-LESS COUPLING
- WEATHERPROOF IP67 HOUSING
- SIMPLE TO INSTALL
- FULLY SERVICEABLE

APPLICATIONS

- TANK LIQUID LEVEL CONTROL
- LOW LEVEL PROTECTION FOR PUMPS
- LEVEL CONTROL IN WATER TREATMENT
- CHEMICAL TANK LEVEL MONITORING
- SAFETY MONITORING IN CHEMICAL TANKS





INTRODUCTION

The L26 series heavy duty level switches provide a highly reliable accurate and low cost solution to tank level control. Offering polypropylene or stainless steel and polypropylene construction, the L26 level switches are built tough, from their high impact weatherproof casing to their high compliance micro switches. These level switches are intended to give long reliable duty under the most arduous conditions. The L26 level switch incorporates our unique seal less magnetic dampening system that both couples the internal switch mechanism to the float arm and ensures a reliable switching action even where surface agitation is present.

The L26 level switch integrates well into modern thermoplastic and fiberglass tank systems. The switches are fitted and removed through the external 25mm B.S.P. socket in which they are installed. There is no need to access the tank from the inside. The standard L26-S has a float arm of sufficient length to clear the inner wall of even the thickest concrete tanks. A short arm L26-SA model is available specifically for small diameter tanks and risers and integrates into vessels down to 100mm inside diameter.

AUSTRALIAN MADE

TECHNICAL DATA

OVERRIDE SWITCH

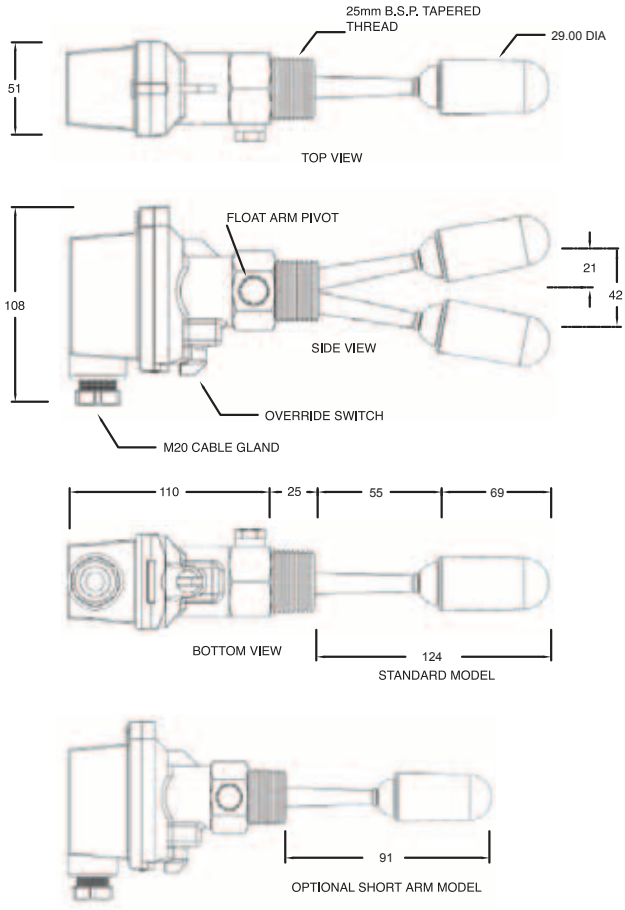
All L26 level switches have a built in two position manual switch that allows the level switch to be overridden regardless of the position of the float. This unique feature means the switch can be tested and operated at any time. The override switch can be used for commissioning systems or for pump priming. In addition it allows the filling of tanks that have been drained to below their normal low level cut out level.

OPERATING ENVIRONMENT

Maximum operating pressure, at ambient temperature.	10 Bars (145 PSI) All models
Minimum burst pressure (Body) at ambient temperature.	80 Bars (1160 PSI) L26-S & L26-SA models only.
Minimum burst pressure (Body) at ambient temperature	100 Bars (1450 PSI) Stainless L26-SS model only
Maximum operating temperature (Liquid)	80 Degrees C at a pressure 1 bar absolute, see note below
Minimum operating temperature (Liquid)	-20˚C
Ingress protection rating (Housing)	IP67

Note: Temperature for the maximum operating pressure shown in the above operating environment table is 15°C, In the interest of safety, when using the polypropylene version of the L26 series, maximum operating pressure must be de-rated linearly in direct proportion to temperature increase, to a maximum pressure of 1 bar absolute at 80 degrees Centigrade. In other words only use this switch at elevated temperatures in non pressurised systems that are totally open to atmosphere in all circumstances and under all conditions.

DIMENSIONS



ELECTRICAL DATA

The L26-S, L26-SS and L26-SA level switches house a 15Amp 500Volt single pole double throw microswitch suitable for most general control applications.

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	0.75A
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	0.5A	0.05A	0.05A	0.05A
250 VDC	0.25A	0.25A	0.25A	0.03A	0.03A	0.03A

MODELS AVAILABLE

L26-S	Standard all polypropylene switch with long float arm 15Amp 500Volt rating
L26-SA	All polypropylene switch with short float arm 15Amp 500Volt Rating
L26-SS	Long arm polypropylene & 316 stainless switch with 15AMP 500Volt rating

KELCO

Q SERIES HEAVY DUTY FLOAT SWITCH

FEATURES

- Extra strong polypropylene float
- S.P.D.T three wire switch
- No mercury or lead components
- High quality rubber cable
- No corrodible metal parts
- Sealed tamperproof design
- Highly chemical resistant
- Wide range of cable lengths available

CABLE DATA

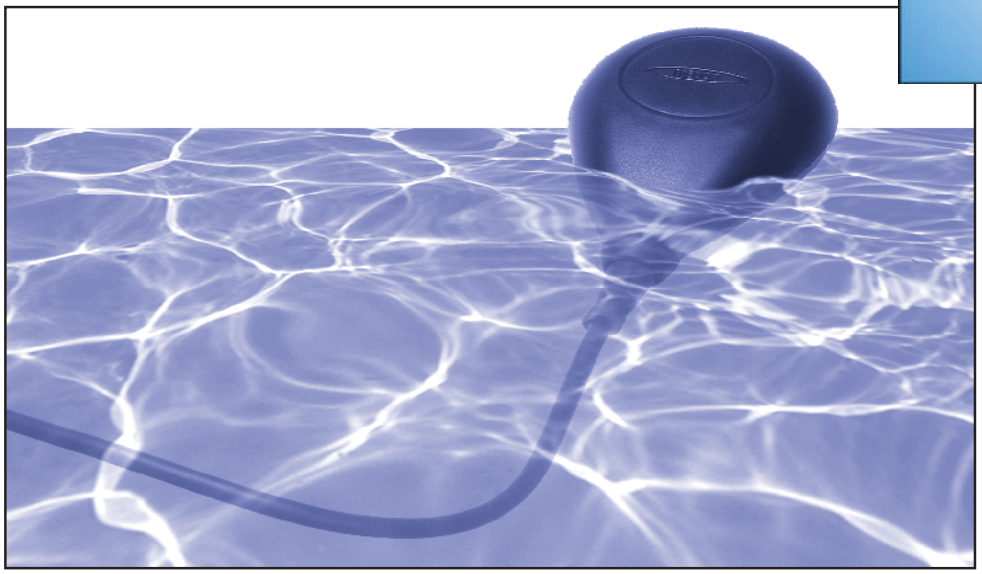
The switch is made of high grade polypropylene. Our high tech manufacturing process produces a sealed, seamless and glandless float that is totally tamperproof and extremely tough.

The heavy duty cable fitted to the Q series switch is constructed from Hypalon Rubber, which is specifically designed for permanent immersion in water. The switch and cable are also resistant to oil, grease, fat, sewerage and a variety of chemicals.

APPLICATIONS

- High and low level control in tanks, pits and dams
- Loss of prime protection for pumps
- Automatic control of sump pumps
- Control of tank filling and draining valves
- Control of levels in effluent and separation pits
- Level control in bulk liquid tanks
- Control of level warning equipment





The Q Series Float Switch consists of a heavy duty polypropylene float double moulded onto a high quality three core cable. The float contains a single pole double throw switch, which can be used to give adjustable control over the level of liquid in tanks, pits and dams. By careful tethering of the cable the switch can be set to give an ON or Off action at any desired position. The heavy duty switch can directly control small pump motors, and is also ideal for instrument or PLC signalling.

AUSTRALIAN MADE

TECHNICAL DATA

OPERATING ENVIRONMENT

Maximum submergence	30metres,300kPa static pressure
Maximum liquid temperature	60ºC
Minimum liquid temperature	-20ºC
Liquid specific gravity	>0.82
Liquid Ph	1 to 14
Smallest diameter well that the switch can operate in	600mm
Liquid level change for the switch to operate	300mm (approx)
Smallest opening through which the switch will fit	108mm
Minimum distance between float and closest tethering point/cable weight	100mm
Suitability for use in diesel fuel	Can be used, but some softening and swelling of the cable and boot may occur
Suitability for use in sodium hypochlorite	Fully Compatible
Suitability for use in sea water	Fully compatible
Suitability for use in octane (petrol)	Not suitable
Suitability for use in potable water	Fully compatible

SWITCH DATA

Switch type	Single Pole Double Throw
Contact gap	1mm
Contact material	Silver Alloy
Contact resistance	15mΩ max
Rated voltage AC	0 - 240V AC
Rated voltage DC	0 - 250V DC
Currant rating resistive AC	21 A at 250V
Motor load current rating AC	4 A at 250V
Current rating resistive DC	0.3 A at 250V
Motor load current rating DC	0.05 A at 250V
Maximum lamp load AC	3 A at 250V
Maximum lamp load DC	0.05 A at 250V
Maximum operating frequency, electrical	60 operations per/min
Insulation resistive	100MΩ min (at 500VDC)
Dielectric strength between contacts	2000 VAC, 50/60Hz for 1 minute
Life expectancy mechanical	50,000,000 operations min
Life expectancy electrical	100,000 operations min
Approved standards	UL508 E41515 CSA C22.2 No.55 (File No LR21642)

IMPORTANT SAFETY NOTE

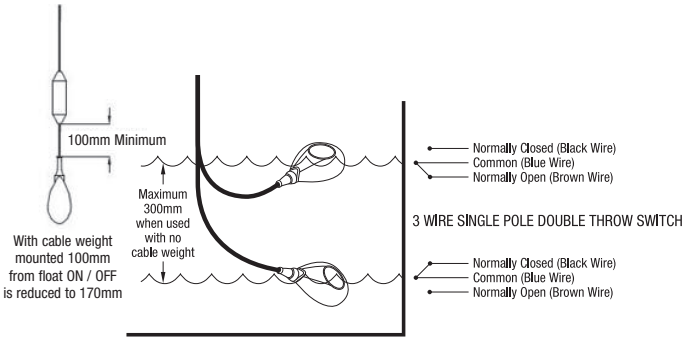
The Q Series Switches have been designed and built to be as tough as possible, and can withstand harsh environments. Great care should be taken to ensure the switch is only installed in positions where it will not be subjected to entanglement, severe agitation and abrasion against tank walls or moving equipment. If the application requires control of mains voltage, local electrical codes may require the switch to be isolated to a low voltage supply. This may be required, regardless of the high voltage rating of the float switch. Please check with your local electrical authority before connecting a Q Series Float Switch to a mains voltage supply.

NSW DEPARTMENT OF MINERALS AND ENERGY APPROVAL NUMBER CS4937N

CABLE DATA

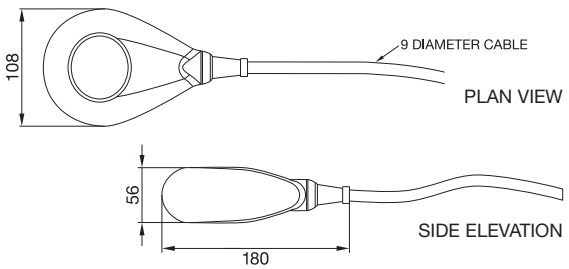
Cable type	Heavy Duty EPR/CSP Flexible Hypalon Rubber
Outer sheathing	CSP Hypalon, Oil Resistant & Flame Retarded to VDO 0472
Inner sheathing	R-EP-90 Special Elastomer Insulation
Cores	3 Cores, Each 1mm Diameter
Cable diameter	9mm Nominal
Core colours	Blue (Common) Black (Normally Closed) Brown (Normally Open)
Cable voltage rating Uo/U	600V / 1kV
AC test voltage	2.5kV
Cable current carrying capacity	18 Amps Continuous at a temperature of 30.5ºC
Cable maximum tensile strength	15N/mm^2
Minimum bending radii	50mm
Maximum ambient operating temperature	80ºC
Minimum permissible ambient temperature	-40ºC
Minimum permissible ambient temperature for fully flexible operation	-25ºC
Cable maximum permissible short circuit temperature	250ºC
Standards of cable construction	Meets or exceeds AS1125, AS3191, AS3116 and DIN/VDE0282
Cable lengths available	1, 3, 4, 6, 10, 15, 20, 30, 50 Metres standard. Against special order switches to 1000 Metres can be supplied

TYPICAL APPLICATION



Switching range adjustable up to a maximum of 300mm depending on tethering point.

DIMENSIONS



KELCO

K SERIES HEAVY DUTY LEVEL REGULATOR

FEATURES

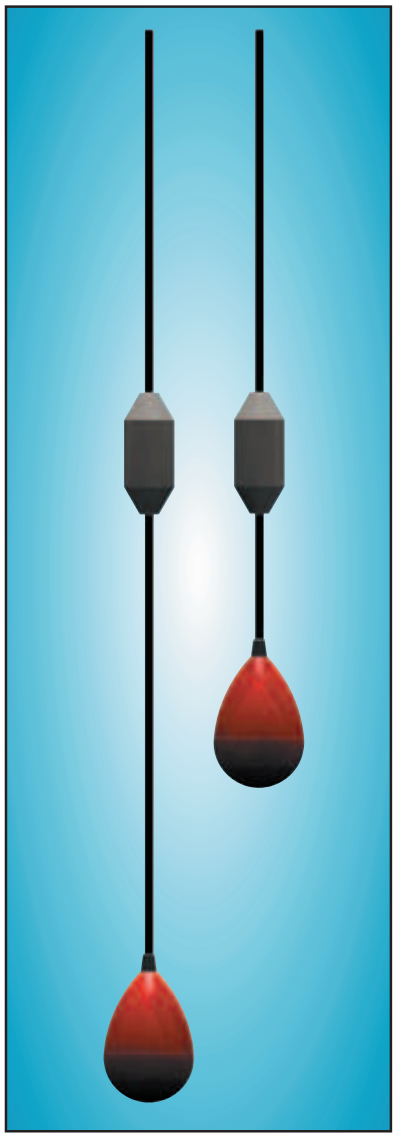
- LOW DIFFERENTIAL SWITCHING
- ALL DIRECTION TILT ACTION
- S.P.D.T 3 WIRE SINGLE POINT SWITCH
- POLYPROPYLENE & HYPALON CONSTRUCTION
- WIDE RANGE OF CABLE LENGTHS AVAILABLE
- STABLE REPEATABLE SWITCHING ACTION
- NO MERCURY OR LEAD COMPONENTS
- COMPACT SIZE, 75mm DIAMETER
- OPTIONAL CABLE WEIGHT AVAILABLE



AUSTRALIAN MADE

APPLICATIONS

- BASIC LIQUID LEVEL CONTROL
- MULTI POINT LEVEL CONTROL
- SEWERAGE LEVEL CONTROL
- CHEMICAL LEVEL CONTROL
- HIGH & LOW LEVEL ALARMS
- SELF POWERED SIGNALLING
- PUMP PROTECTION



The K series heavy duty level regulator is a compact three-wire float switch for highly accurate and repeatable single point level sensing and control applications. It is ideal for use in water, sea water and most acids and alkali solutions. It will provide a stable switching action with a very high degree of reliability. The teardrop shape of the float makes it ideal for effluent and sewerage usage, as the float cell has no shoulders or edges for solids to build on. These float switches can be reliably and safely used in potable water systems, as they do not contain hazardous materials such as mercury or lead.

OPERATING PRINCIPLE

The K series level regulator houses a heavy ball that is balanced on the actuating arm of a high precision switch. When rising liquid level causes the float to lift and tilt, the centre of gravity of the ball moves away from the actuating axis of the switch and allows it to de-actuate. A falling liquid level allows the float to straighten up and the centre of gravity of the ball shifts back onto the switch causing it to again actuate. This simple reliable action only requires the float to tilt by 45 degrees in any direction for the switch to operate.

CONSTRUCTION

The K series heavy duty level regulator is constructed from polypropylene and high compliance three core Hypalon cable. The float chamber is a double moulded hermetically sealed cell with a double moulded barrier of solid polypropylene sealing the cable entry. The switch housed within the float cell is a precision single pole double throw device rated at 0 to 240V AC at up to 15 Amps resistive load.

HAZARDOUS APPLICATIONS

This level regulator is classed as a simple device and does not require separate certification to be used in hazardous applications. In any such installation the level regulator should be isolated by an intrinsically safe barrier, a zener barrier.

IMPORTANT SAFETY NOTE

The K series level regulators are rated for mains voltage operation. However, in the interest of safety we recommend that they are only ever operated at low voltage, preferably at 24 to 48V AC. Where mains voltage operation is unavoidable an earth leakage circuit breaker should always be installed in the control circuit. The application and wiring of this float switch should always be carried out by qualified electrical personnel and must always conform to local wiring rules.

TECHNICAL DATA

CABLE SPECIFICATIONS

Cable type	Heavy Duty EPR/CSP Flexible Hypalon Rubber
Outer sheathing	CSP Hypalon, Oil Resistant & Flame Retarded to VDE 0472
Inner sheathing	R-EP-90 Special Elastomer Insulation
Cores	3 Cores, each 0.75mm Sq. tinned copper
Cable diameter	7.5mm Nominal
Core colours	Blue (Common) Black (Normally Closed) Brown (Normally Open)
Cable voltage rating Uo/U	600 V / 1kV
AC test voltage	2.5kV
Cable current carrying capacity	18 Amps Continuous at a temperature of 30.5ºC
Cable maximum tensile strength	30 N
Minimum bending radii	40mm
Maximum ambient operating temperature	80ºC
Minimum permissible ambient temperature	-40ºC
Minimum permissible ambient temperature for fully flexible operation	-25ºC
Cable maximum permissible short circuit temperature	250ºC
Standards of cable construction	Meets or exceeds AS1125, AS3191, AS3116 and DIN/VDE0282
Cable lengths available	1, 3, 4, 6, 10, 15, 20, 30, 50 Metres standard. Against special order switches to 1000 Metres can be supplied

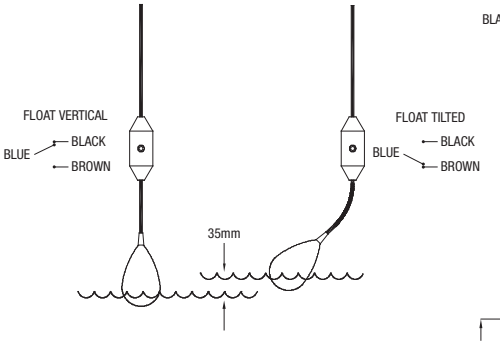
ENVIRONMENTAL LIMITATIONS

Maximum submergence	30meters,300kPa Static pressure
Maximum liquid temperature	60ºC
Minimum liquid temperature	-20ºC
Liquid specific gravity	>0.82
Liquid Ph	1 to 14
Smallest diameter well that the switch can operate in	Within a 160mm inside diameter vertically mounted pipe
Liquid level change for switch to operate	35mm
Closest switching point to tank floor	50mm
Smallest opening through which the switch will fit	75mm diameter
Minimum distance between float and closest tethering point or cable weight	150mm
Suitability for use in Diesel Fuel	Can be used, but some swelling and softening of the cable & boot may occur
Suitability for use in Sodium Hypochlorite	Fully Compatible
Suitability for sea water use	Fully Compatible
Suitability for use in Octane (Petrol)	Not suitable
Suitability for use in potable water	Fully Compatible

SWITCH SPECIFICATIONS

Switch type	Single Pole Double Throw
Contact gap	0.5mm
Contact material	Silver Alloy
Contact resistance	15m Ohms (initial value)
Rated voltage AC	0 to 240V AC
Rated voltage DC	0 to 250V DC
Currant rating AC resistive	15 A at 250V AC, 15A at 125V DC
Motor load currant rating AC	1.5 A at 250V AC, 2.5A at 125V AC (1/4HP)
Currant rating DC Resistive	15 Amps at 14V DC, 6 Amps at 30V DC
Maximum lamp load AC	1.25 Amps at 250V AC
Maximum lamp load DC	1.5 Amps at 30V DC
Minimum operating load	100mA at 12V, or 60mA at 24V
Maximum operating frequency, electrical	24 operations per minute
Insulation resistance	100M Ohms minimum at 500 V DC
Dielectric strength between contacts	1000 V AC at 50 to 60Hz for 1 minute
Life expectancy Mechanical	20,000,000 operations minimum
Life expectancy Electrical	500,000 operations minimum
Approved standards	UL508 E41515, CSA C22.2 No55 (File No LR21642)

OPERATION



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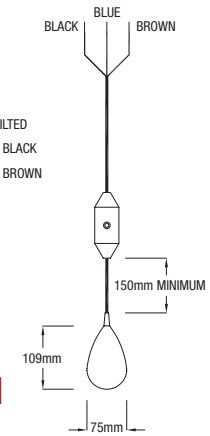

TYPICAL INSTALLATION

