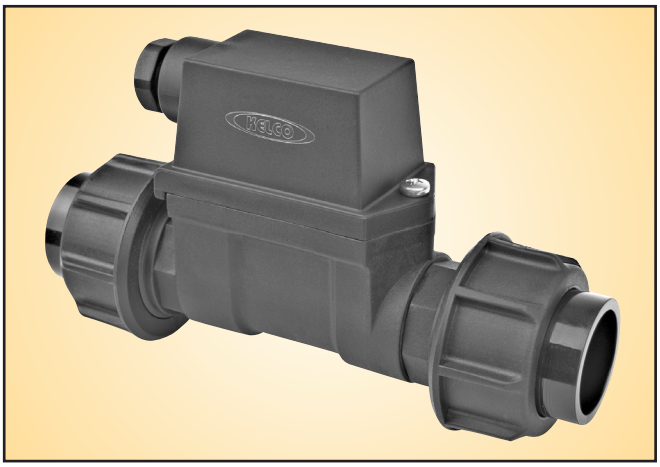
KELCO

P25 SERIES CORROSION RESISTANT INLINE FLOW SWITCH



FEATURES

- DIRECTLY CONTROL PUMP MOTORS
- IDEAL FOR PLC AND RELAY LOGIC
- MANUAL OVERRIDE (P25-S MODEL)
- SUITS PIPES 15mm TO 25mm (1/2” to 1”) DIA.
- NO METAL PARTS IN CONTACT WITH LIQUIDS
- 100 LITRES PER MINUTE FLOW RATING
- VERSATILE ALL POSITION MOUNTING
- 18 BAR (260 PSI) PRESSURE RATING
- 1P67 WEATHERPROOF HOUSING
- DETECTS VERY LOW FLOWS

APPLICATIONS

- SAFETY SHOWER ALARMS
- LOSS OF PRIME PROTECTION FOR PUMPS
- FLOW MONITOR FOR LARGE DOSING SYSTEMS
- CONSTANT PRESSURE PUMP CONTROL
- CONTROL OF TANK FILLING SYSTEMS
- LOW YIELD BORE PUMP PROTECTION

DESCRIPTION

The P25 inline flow switch is a rugged versatile all position mounting flow actuated switch that can detect the flow of liquids in 15mm (1/2”) to 25mm (1”) diameter pipes. The P25 can be used in larger pipe systems provided the maximum flow does not exceed 100 litres per minute. The switch can detect very low flows and yet has a low head loss high flow through rating. It can be used to detect continuous or pulsed flows. The P25 finds a myriad of applications in industrial, rural and domestic pumping 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 can be used to protect low yield bore pumps and in tank filling applications. 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 and in acidic and alkali solutions.

The P25 flow switch is supplied complete with unions and standard PVC pipe sockets for direct solvent gluing into PVC pipework. The union threads on the P25 are standard parallel BSP form and where required can be used to secure the switch directly into threaded pipework.

AVAILABLE MODELS

The P25 flow switch is available in one of three electrical configurations to suit one of three different pipe sizes. In addition the user has a choice of one of three different flow sensitivity rates, or switching points.

P25-S
The P25 can be supplied with a heavy-duty single pole double throw (S.P.D.T.) mechanical switch specifically designed for the direct control of pump motors up to 1.5kW 2HP. This switch is designated P25-S. This model is also ideal for general control circuit applications up to 500VAC. The P25-S flow switch is only available fitted with a “B” piston. See the table below for the “B” pistons switching point details.

P25-B
The P25-B model contains a dry contact normally open reed switch (S.P.S.T.NO) that closes on flow. This switch is ideal for PLC input, general relay logic and control circuit applications and for telemetry control. The reed switch is rated to 240VAC 40 watts.

P25-C
The P25-C model is similar to the P25-B, except it uses a single pole double throw reed switch (S.P.D.T), as the primary switching element. This switch is suitable for use in low voltage light duty failsafe control circuits and for PLC input and telemetry circuits.

The P25 can be supplied with pipe unions and PVC pipe sockets to suit solvent welding into PVC pressure pipe, in 15mm (1/2”), 20mm (3/4”), or 25mm (1”). In addition, in each case, the male threads on the unions supplied with the flow switch have parallel BSP threads that are 2 pipe sizes larger than the PVC sockets supplied with the switch. For example the 25mm model has unions with 40mm ($1^1/_2$” BSP) male threads. These union threads can be used to mount the flow switch directly into pump discharge ports or into threaded pipework if required. On all models the complete discharge union assembly can be unscrewed and removed from the switch body and the 25mm (1”) BSP female thread in the switch body can be used directly as the outlet process connection.

The P25 flow switch is available with one of three different pistons, designated A, B and C. Each piston requires a specific flow rate to cause it to move and actuate the switch.

The switching point for each piston is given in the table below. The table refers to water at ambient temperature as the process medium. Liquids of high viscosity will proportionally lower the switching threshold and equally, low viscosity liquids will proportionally increase the flow rate required to actuate the switch.

SWITCHING POINTS

Available Pistons	Switching point on a slowly rising flow in litres per minute +/- 5%	Switching point on a slowly reducing flow in litres per minute +/-5%	Electrical response time in seconds (approx.)
A	1.0	0.6	0.1
B	4.7	2.7	0.1
C	7.3	4.5	0.1

AUSTRALIAN MADE

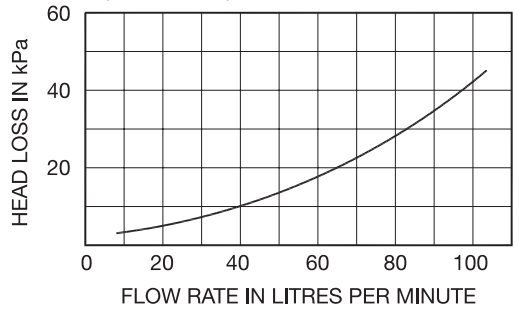
TECHNICAL DATA

MANUAL OVERRIDE

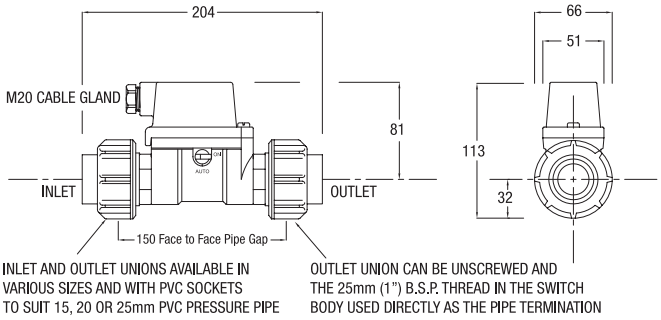
The P25-S model is fitted with a manual override. The override is located under a locking cover on the side of the switch body. The override is normally left in the “Auto” position. It can be rotated to “ON” to override the flow switch, regardless of flow. The override can be set to “ON” to allow pumps to prime, in spite of an initial lack of flow. It can also be used to test control circuit wiring during commissioning of pump systems. The P25-B and P25-C models are not fitted with a manual override.

HEAD LOSS

The graph below shows the head loss, or pressure drop, measured between the inlet and outlet of a P25 flow switch and expressed as a function of a continuous flow through the switch. The graph shown is for water at ambient temperature. As an example, from the graph, at 40L/min flow the pressure drop across the P25 will be 10kPa.



DIMENSIONS



INLET AND OUTLET UNIONS AVAILABLE IN VARIOUS SIZES AND WITH PVC SOCKETS TO SUIT 15, 20 OR 25mm PVC PRESSURE PIPE

OUTLET UNION CAN BE UNSCREWED AND THE 25mm (1”) B.S.P. THREAD IN THE SWITCH BODY USED DIRECTLY AS THE PIPE TERMINATION

OPERATING ENVIRONMENT

Switching point on a slowly rising flow (water at ambient temperature) +/- 15%	Depends on which piston is fitted to the switch. See the table marked “Switching Points” for details
Minimum gravity head required to actuate the P25-B & P25-C flow switch	1.4 Meters
Maximum recommended continuous flow rate through the switch	100 Litres per minute (Head loss will be < 50kPa at 100 L/min)
Maximum recommended operating pressure, static or dynamic, at ambient temperature	18 Bars (260 PSI)
Minimum Burst pressure at ambient temperature	6000 kPa (865 PSI)
Maximum liquid temperature	60ºC
Minimum Liquid temperature	-20ºC
Liquid Ph range	1 to 14
Weatherproof rating	IP67

ORDERING

SWITCHING POINT SET BY PISTON A, B or C

P25 — B — A — 25

ELECTRICAL MODULE
B = SINGLE POLE SINGLE THROW NORMALLY OPEN REED SWITCH
C = SINGLE POLE DOUBLE THROW REED SWITCH
S = 500VAC 15A 2HP RATED S.P.D.T MECHANICAL SWITCH

PROCESS CONNECTION
PVC SOCKETS TO SUIT PRESSURE PIPE
15 = 15 NB
20 = 20 NB
25 = 25 NB

SPARE PARTS

All component parts of the P25 flow switch are available as spare parts.

HAZARDOUS APPLICATIONS

The P25 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 P25 flow sensor can be used in hazardous applications provided it is isolated by an intrinsically safe barrier, a zener barrier.

ELECTRICAL DATA

Switch Model	Module Type	Contact Configuration	Switched Power Maximum	Switched Voltage Maximum	Switched Current Resistive AC (rms)	Inductive Loads	Typical Application
P25-B	Dry Contact Reed Switch	S.P.S.T NO	40Watts	240V AC 200V DC	1 Amp Maximum	Not Suitable	PLC Telemetry and Relay Logic circuits
P25-C	Dry Contact Reed Switch	S.P.D.T.	20Watts	140V AC 150V DC	1 Amp Maximum	Not Suitable	PLC Telemetry and Relay Logic circuits
P25-S	Heavy Duty Mechanical Switch	S.P.D.T.	1.5kW 2HP	500V AC 250V DC	20 Amps @ 240V AC	Direct Control of Motors to 1.5kW 2HP	AC control circuits & AC motor control

Note: The P25-B and P25-C flow switch use a dry contact reed switch as the primary switching element. Reed switches are one of the most reliable mechanical devices ever devised. They offer an operating life in excess of 100 million cycles; however care needs to be taken to ensure they are not electrically overloaded. If applied in questionable applications suitable protection should be added to the control circuit. Details of reed switch protection circuits can be downloaded from www.kelco.com.au

Power Control PRODUCTS
Unit 3, 8 Hayden Court, Myaree WA 6154
Phone (08) 9317 4322, Fax (08) 9317 4465
www.powercontrol.com.au

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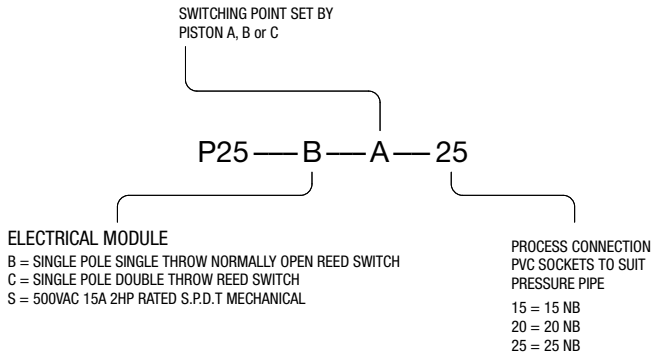
INSTALLATION AND OPERATION OF THE P25 INLINE FLOW SWITCH

INTRODUCTION

The P25 flow switch is a 25mm (1") magnetically operated inline flow sensor that will provide an electrical signal in response to liquid flow through the switch body. The switch is available with a choice of 3 different electrical configurations, three different switching points and three different size pipe terminations. The following model designation describes the various options.



The P25 flow switch has no metal parts in contact with the process liquid. Inert thermoplastics are all that come in contact with liquid passing through the switch. This means the P25 can be used in aggressive chemical solutions, seawater and bore water and in many fluids that would attack metal parts, including most acids and alkalis. The P25 contains a close fitting piston and should only be used in applications where the process fluid is clean and free from entrained or suspended materials. Solutions that contain large particulates, ferrous materials or fibrous matter should not be used in this switch. If the degree of contamination of the process liquid can't be guaranteed then a suitable line strainer should be installed prior to the flow switch.

The P25 flow switch is made from glass reinforced polypropylene with neoprene o-rings. The switch is weatherproof and it is suitable for all outdoor exposed applications. The switch should be protected from freezing and from exposure to hot liquids >70ºC. The P25 flow switch must not be used in applications where the static or dynamic pressure exceeds 18 Bars. Care should be taken to ensure the switch is not exposed to water hammer.

The following table sets out the environmental limitations of the P25 flow switch.

OPERATING LIMITATIONS

Maximum Recommended Continuous Flow Rate	100 Litres per Minute (Head loss across the switch <50kPa at 100L/min.)
Maximum Recommended Operating Pressure (Static or Dynamic) at Ambient Temperature	18 Bars (260 P.S.I.)
Minimum Burst Pressure at Ambient Temperature	60 Bars (865 P.S.I.)
Maximum Liquid Temperature	60ºC
Minimum Liquid Temperature	-20ºC
Liquid Ph Range	1 to 14
Ingress Protection Rating	IP67

IMPORTANT NOTE: Maximum operating pressure given in the table above must be de-rated in proportion to temperature increase and in consideration of any chemical solutions being processed. At top operating temperature (60ºC) the maximum operating pressure is 1 Bar absolute. (Fully open atmospheric discharge).

ACTUATING FLOW

The P25 flow switch is available with one of three different pistons, designated A, B and C. Each piston requires a specific flow rate to cause it to move and actuate the switch.

Note that the P25-S is only available fitted with the "B" piston.

The switching point for each piston is given in the table below. The table refers to water at ambient temperature as the process medium. Liquids of high viscosity will proportionally lower the switching threshold, and equally, low viscosity liquids will proportionally increase the flow rate required to actuate the switch.

Available Pistons	Switching point on a slowly rising flow in litres per minute +/- 5%	Switching point on a slowly reducing flow in litres per minute +/-5%	Electrical response time in seconds (approx.)
A	1.0	0.6	0.1
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C	7.3	4.5	0.1

Note: Pistons are identified by a small mound or brail bump on the front face of their guide fins. The A piston has one bump, the B piston 2 and the C piston 3. The brail bumps can be seen when looking into the inlet of the P25 flow switch.

INSTALLATION

The P25 flow switch can be mounted in any orientation including upside down. There is a direction of flow arrow on the switch body. This directionality must be adhered to, as the switch will not operate against a reverse flow. Pipework can be used to support the switch, or the switch can be connected directly to valve manifolds or pump ports. Do not use this flow switch as a non-return valve.

OVERRIDE SWITCH (P25-S Model Only)

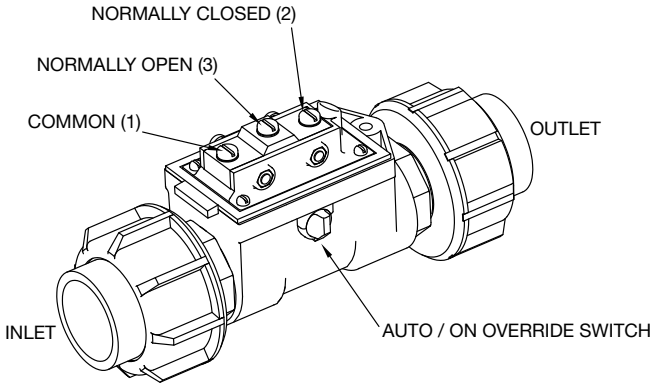
The P25-S flow switch is fitted with a manual override. This allows the switch to be actuated even if there is no flow. The override is located on the side of the switch body, under a locking cap. The locking cap can be removed by placing a small screwdriver in the notch provided on the underside of the cap. The cap simply pops off when lifted gently. The override dial turns through 90 degrees between AUTO and ON. In the ON position the state of flow is ignored and the flow switch will be on. The override can be used to override the off state of the flow switch and allow pumps to be started. It can also be used when installing or commissioning systems to simulate switch operation.

ELECTRICAL

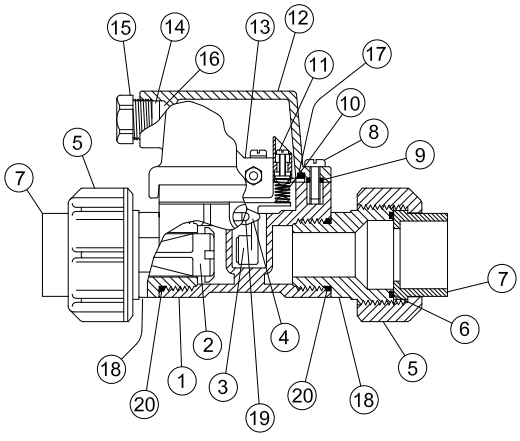
For all mains voltage applications, all electrical work associated with the P25 flow switch must be carried out by qualified persons only, and must conform to local wiring rules. The following table sets out the electrical parameters of the available models.

Switch Model	Module Type	Contact Configuration	Switched Power Maximum	Switched Voltage Maximum	Switched Current Resistive AC (rms)	Inductive Loads	Typical Application
P25-B	Dry Contact Reed Switch	S.P.S.T NO	40Watts	240V AC 200V DC	1 Amp Maximum	Not Suitable	PLC Telemetry and Relay Logic circuits
P25-C	Dry Contact Reed Switch	S.P.D.T.	20 Watts	140V AC 150V DC	1 Amp Maximum	Not Suitable	PLC Telemetry and Relay Logic circuits
P25-S	Heavy Duty Mechanical Switch	S.P.D.T.	1.5kW	500V AC 250V DC	20 Amps @ 240 V AC	Direct Control of Motors to 1.5 kW 2 HP	AC control circuits & AC motor control

DETAILS OF THE P25-S FLOW SWITCH



PART NUMBERS FOR THE P25-S



P25-S MODEL ONLY

ITEM	DESCRIPTION	QTY	MATERIAL
1	BODY	1	GLASS REINFORCED POLYPROPYLENE
2	PISTON	1	GLASS REINFORCED POLYPROPYLENE
3	SWITCH ARM & MAGNET	1	ABS
4	TOGGLE ASSEMBLY	1	ABS
5	UNION NUT	2	GLASS REINFORCED POLYPROPYLENE
6	O-RING	2	NEOPRENE
7	PIPE SOCKET	2	PVC
8	LID SCREW	1	M5 BY 16 STAINLESS PAN HEAD
9	RETAINER RING	1	NEOPRENE
10	SPRING	1	STAINLESS STEEL
11	SENSITIVITY ADJUSTMENT	1	M3.5 BY 14 STAINLESS PAN HEAD
12	LID	1	GLASS REINFORCED POLYPROPYLENE
13	MICROSWITCH ASSEMBLY	1	A20 MICROSWITCH AND CARRIER
14	GLAND BACKING RING	1	GLASS REINFORCED POLYPROPYLENE
15	GLAND NUT	1	GLASS REINFORCED POLYPROPYLENE
16	CABLE GROMMET	1	SANTOPRENE
17	LID GASKET	1	SANTOPRENE
18	25 by 40 ADAPTOR A & B	2	GLASS REINFORCED POLYPROPYLENE
19	TOGGLE O-RING	1	NEOPRENE
20	BODY O-RING	2	NEOPRENE

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