

KU SERIES HEAVY DUTY LEVEL REGULATORS

FOR DIESELINE, SEWAGE AND EFFLUENT APPLICATIONS

FEATURES

- ROBUST DOUBLE MOULDED CONSTRUCTION
- POLYURETHANE 3 CORE CABLE
- POLYPROPYLENE HOUSING
- LOW SWITCHING DIFFERENTIAL (75mm)
- ALL DIRECTIONAL TILT ACTION
- STABLE REPEATABLE SWITCHING
- COMPACT SIZE 75mm DIAMETER
- OPTIONAL CABLE WEIGHT AVAILABLE

APPLICATIONS

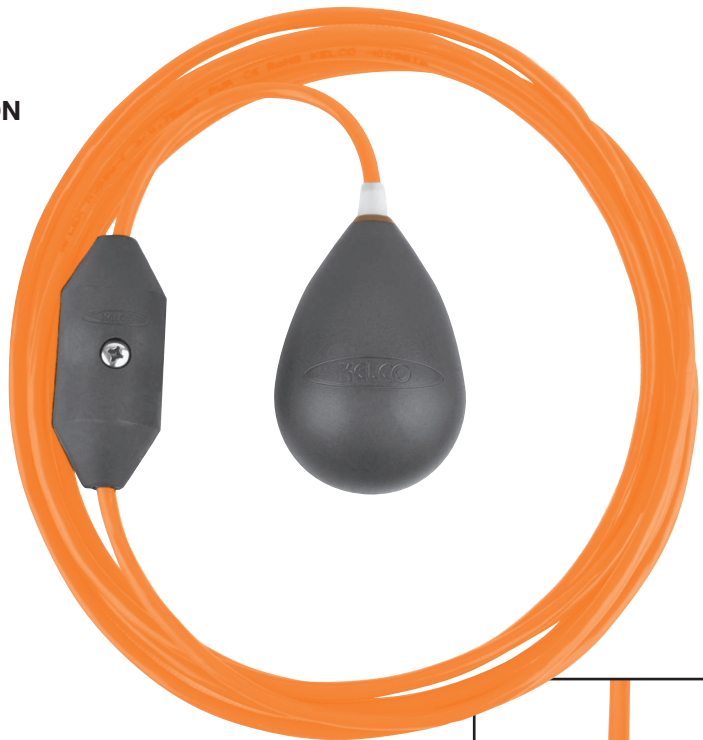
- DIESEL FUEL TANKS
- SEWAGE LEVEL CONTROL
- EFFLUENT PITS AND WASTE TRAPS
- HIGH AND LOW LEVEL ALARMS

DESCRIPTION

The KU series level regulator is a compact three-wire switch specifically designed for single point level control in liquids. It is highly suited to use in sewage and effluent and any liquid containing oils, uric acid or fats. Its ability to withstand oils makes it suitable for level control in diesel fuel tanks and in applications involving bulk diesel or oil. The KU series level regulator will provide a stable switching action with a high degree of repeatability.

OPERATING PRINCIPLE

The KU 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 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 de-actuate. This simple reliable action only requires the float to tilt by 45 degrees in any direction for the switch to operate.



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CONSTRUCTION

The KU series heavy-duty level regulator is constructed from Polypropylene and specially manufactured three-core oil resistant Polyurethane 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.

TECHNICAL DATA

IMPORTANT SAFETY NOTE

While rated to control mains voltage, we recommend that in the interests of safety the KU Series level regulator only ever be used with control voltages in the range of 12 volt to 48 volt AC or DC.

SWITCH SPECIFICATIONS

Switch type	Single pole double throw
Contact gap	0.5mm
Contact material	Silver alloy
Rated voltage AC	0 to 240V AC (See note below)
Rated voltage DC	0 to 250V DC (See note below)
Current rating AC resistive	15A at 250V AC, 15A at 125V DC
Motor load current rating AC	1.5A at 250V AC, 2.5A at 125V AC (1/4HP)
Current rating DC resistive	15 Amps at 14V DC, 6Amps 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
Dielectric strength between contacts	1000V AC at 50 – 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)

Note: In the interests of safety only ever operate the KU series level regulators at low voltage (12 to 48V AC or DC).

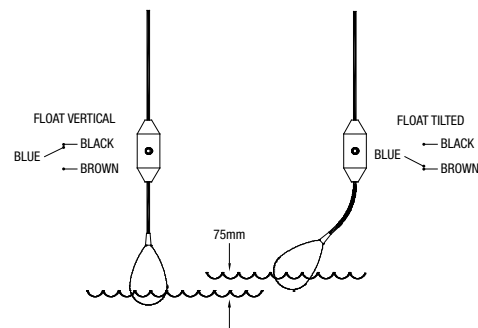
CABLE SPECIFICATIONS

0.75mm 3 core Polyurethane clad cable 7mm diameter
Current rating 12 amps maximum at 40°C
Temperature range: 40 ~ 125°C
Excellent low temperature flexibility
Ageing resistance
Tear and tear propagation resistant
Wear resistant
Resistant to oils, fats, mild acids
Dieseline resistant
Halogen free
High flexural fatigue strength

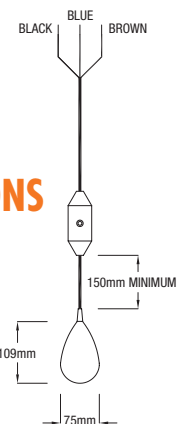
ENVIRONMENTAL LIMITATIONS

Maximum submergence	30 metres, 300Kpa static pressure
Maximum liquid temperature (Diesel)	40°C
Maximum liquid temperature (sewage)	60°C
Minimum liquid temperature	0°C
Liquid specific gravity	Greater than 0.8
Liquid PH	1 to 14
Smallest diameter tank the switch can operate in	300mm inside diameter pipe
Liquid level change for switch to operate	75mm
Closest switching point to tank floor	100mm
Minimum distance between float and closest tethering point or cable weight	200mm

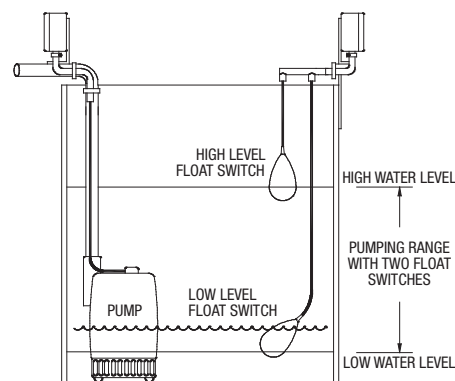
OPERATION



DIMENSIONS



TYPICAL INSTALLATION



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INSTALLATION AND OPERATING INSTRUCTIONS FOR THE KU SERIES HEAVY DUTY LEVEL REGULATOR

PLEASE READ THIS INSTALLATION SHEET CAREFULLY AND FULLY BEFORE INSTALLING THIS LEVEL SWITCH

APPLICATION

The KU series heavy duty level regulator is a low hysteresis tilting float switch capable of providing an on or off signal at a single fixed point in a tank or sump. The low differential switching means the regulator switches when the liquid level reaches it and rises by a further 75 mm. If the level then falls by 75 mm the switch de-actuates. These float switches are ideal for single point switching applications such as high and low level alarms. Where multiple switching points are required or where a level difference of greater than 75 mm is needed multiple float switches should be used.

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

ENVIRONMENT

This switch is constructed from polypropylene and polyurethane shielded cable. There are no metal parts in contact with the process liquid and this switch can be used in water, sea water, acids, alkalis and a great variety of chemical solutions including oil, oily waste, fats and in effluents of many types.

This float switch should not be used in closed vessels at greater than 300 kPa static pressure, or in submerged applications at greater than 30 metres.

Do not expose this switch to liquid temperatures of less than -20°C or greater than $+60^{\circ}\text{C}$. The switch and cable will withstand temperatures outside these limits but the service life may be reduced. Liquids in which this switch is to operate must have a specific gravity of greater than 0.82. In liquids of low specific gravity the buoyancy of the float is reduced and a proportionally higher operating differential results.

INSTALLATION

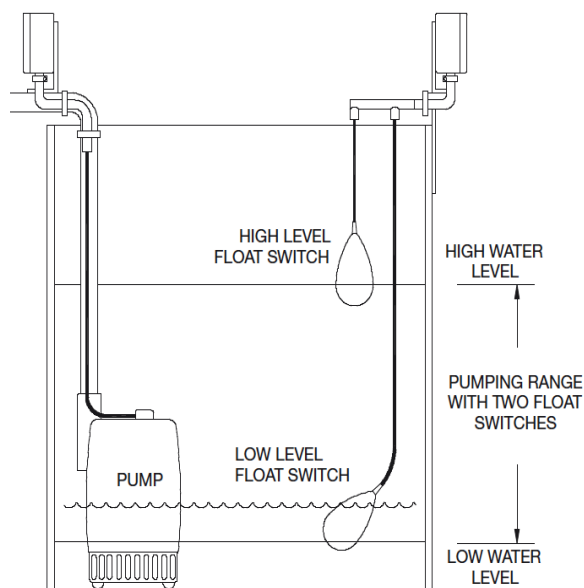
A little care taken when installing this float switch will greatly prolong its service life. Select the installation site carefully. Avoid installing this switch in any area where there is likely to be turbulence or where the float or cable will abrade against tank walls, piping or pumps. Any abrasion between the switch cable and adjacent surfaces will greatly reduce the life of the switch and may cause premature failure. In areas where several float switches are to be installed it is essential to ensure the cable from adjoining switches do not rub or tangle. Do not install this float switch hard against the side of a tank or pit, to do so limits the free movement of the float and will impede the switching action. Suspend the switch away from tank walls and stand pipes by at least 100 mm.

Heavy polypropylene cable weights are available to suit the float switches. If a cable weight was supplied simply clamp the weight onto the cable using the stainless screw provided. Position the weight at least 150 mm above the float. Multiple weights can be installed spaced along the switch cable if required.

When tethering the float switch, allow at least 150 mm of free cable between the float and the first tethering point. The free cable allows the float to swing and tilt in response to liquid level changes. Flexing of the cable should be distributed evenly along the cable and must not be confined to one point. If the free movement of the cable is restricted it can cause work hardening of the copper strands within the cable and lead to premature failure of the switch.

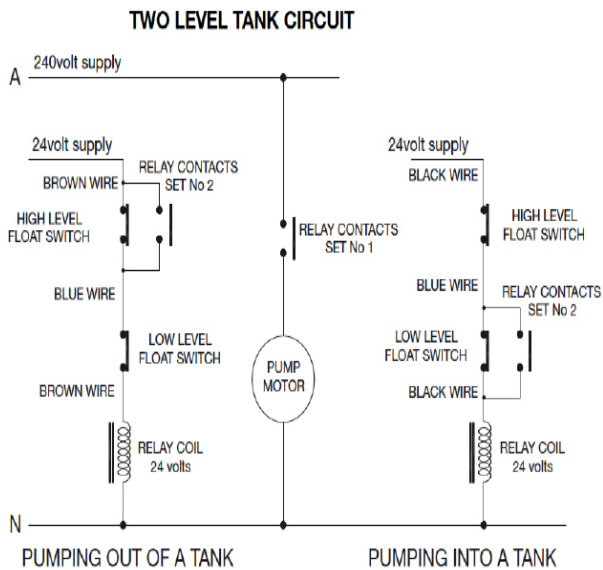
Where possible keep the exposed cable out of direct sunlight. For example, on top of a tank, terminate the cable in a suitable junction box or run the switch cable inside a length of conduit and do not simply drape the cable over the exposed tank rim. Prolonged exposure to sunlight may perish and crack the cable leading to premature switch failure.

TYPICAL INSTALLATION

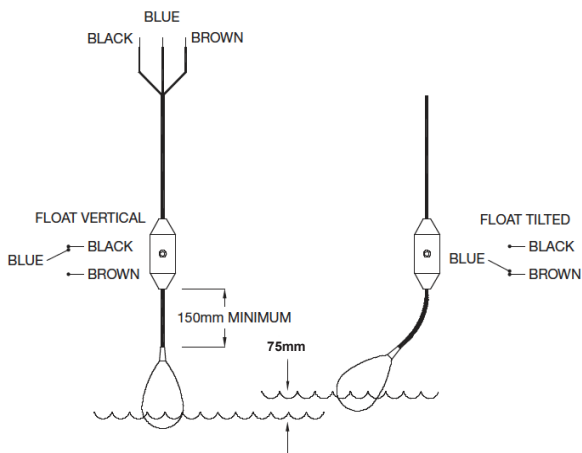


ELECTRICAL INSTALLATION

All electrical work associated with this float switch must conform to local and national wiring codes and must be carried out by qualified persons only.



Wire colours and functions



ENVIRONMENTAL LIMITATIONS

Maximum submergence	30 metres, 300kpa static pressure
Maximum liquid temperature	60°C
Minimum liquid temperature	-20°C
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	75mm
Closest switch 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	Fully compatible
Suitability for use in sewage	Fully compatible

The KU series heavy duty level regulator is rated at 240VAC. However, in the interests of safety the KU series level regulator should only ever be used with control voltages in the range of 12 volts to 24volts AC or DC

This float switch houses a single pole double throw switch. The electrical rating of the switch is indicated on the outside face of the float. Connection is via 3-core 0.75mm polyurethane clad cable. With the float hanging vertically the core colours are Blue, Common, Black Normally Closed and Brown Normally Open. When liquid level rises and tilts the float 45° Blue to Brown closes and Blue to Black opens.

As a general guide terminate the float switch well above the liquid high level in the tank or pit. Where possible avoid running the float switch cable any appreciable distance through conduit as this makes servicing, testing or replacement more difficult.

Most installations will only require the use of two of the three available wires. This will be the blue common and one of the other two wires. Be aware that when the float switch actuates the unused wire will be live, and it must therefore always be isolated.

In installations where two float switches are to be used to control the high and low levels in a tank or pit a latching circuit is normally used. A basic schematic for such a circuit is shown. In the circuit drawing a double pole relay is used to latch the pump on. The latch is broken by either the high or low-level float switch changing state, depending on whether the tank is to be emptied or filled.

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