

INSTALLING AND OPERATING THE KELCO Q SERIES HEAVY DUTY FLOAT SWITCH



WARNING



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

APPLICATION

The Q Series heavy duty float switch is a two position level regulator, capable of giving an on or off switch action at two distinct levels in a pit or tank, containing liquid. The difference in height between the on and the off point which can be attained with this switch is between 170 mm and 300 mm, in water. For applications where the level change is greater than 300 mm, two switches should be used, one to actuate at high level and one at low level. This switch is suitable for use in potable water as well as in waste and effluents. There is no mercury used in this switch, so it is environmentally safe.

ENVIRONMENT

This switch is constructed from polypropylene with CPE rubber shielded cable. There are no metal parts in contact with the process liquid. The switch can therefore be used in water, seawater, acids, alkalis, and a great variety of chemical solutions, including oil, oily waste, fats and effluent of many types. This float switch should not be used at greater than 30 metres submergence in water, or in closed vessels at greater than 300 kPa pressure. Do not expose this switch to liquid temperatures less than -20°C or greater than 60°C . Liquids in which this switch operates should have a specific gravity greater than 0.6. In liquids of low specific gravity, the buoyancy of the switch is reduced and a proportionally lower operating differential results.

MECHANICAL INSTALLATION

A little care taken when installing this float switch will greatly influence and prolong its service life. Select the installation site carefully. Avoid installing this switch in any area where there is excessive turbulence, or in situations where the switch will rub or foul against any object. Any abrasion between the switch cable and any adjacent surfaces will greatly reduce the life of the switch and may cause premature or unpredictable failure. In areas where several float switches are to be installed, it is essential to ensure the cables from adjoining switches do not become tangled or abrade against each other.

Optional standard cable weights (Kelco part number QCW) are available to suit the Q Series float switch. The weight is constructed from a heavy grade of polypropylene. If a standard weight was supplied with this switch, unscrew the halves, place the wire in the channel, reassemble, position the weight on the cable where desired and tighten the halves. Position the weight at least 100 mm away from the float. See Fig 1 for details.

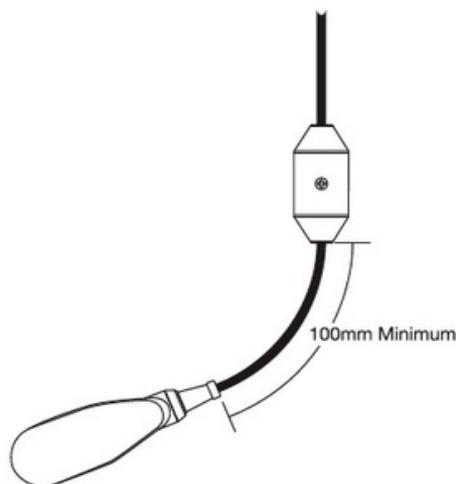


Fig. 1

Fig 2. depicts a tidy method of installing multiple float switches, using a length of PVC pipe as a central cable conduit. Alternatively the float switch may be simply strapped to a pump discharge pipe, using cable ties.

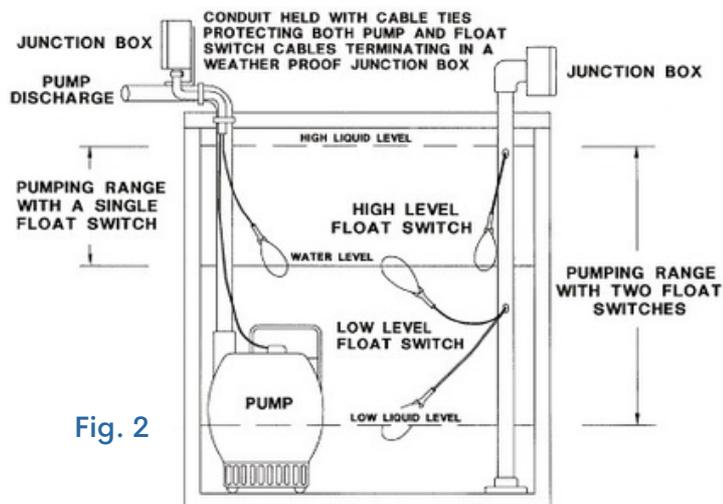


Fig. 2

Where possible tether the switch cable to a suitable standpipe. This will limit its movement to within its operating range and avoid unnecessary cable freedom and potential for abrasion or tangling. Do not tether the cable closer than 100 mm from the end of the cable boot. To do so greatly increases the severity of the flexing arc through which the cable must move, as the float rises and falls. This contributes to premature work hardening of the copper strands in the cable and may eventually contribute to failure of the switch. Where possible keep the exposed rubber cable out of direct sunlight. For example, at the top of a tank, terminate the float switch in a suitable junction box; do not simply drape the cable over the tank rim or across exposed ground. Prolonged exposure to sunlight will perish and crack the cable.



WARNING



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

ELECTRICAL INSTALLATION

This switch is rated to control 240 volt circuits. **In the interest of safety, lower voltages, such as 24 or 48 volts should be used wherever possible.**

If the switch is used in a 240 volt control circuit, it must always be isolated via an earth leakage circuit breaker. This float switch contains a Single Pole Double Throw (S.P.D.T) microswitch. The rating of the microswitch is indicated on the face of the switch. Connection is via three core 1.5mm rubber clad cable. Core colours are blue, black, and brown. The blue wire is common. With the switch hanging vertically down, the black wire to blue is closed and the brown to blue, open.

If the switch is inverted, so the cable hangs vertically below the switch, the blue wire to black is open circuit and the blue to brown closed. As a general guide, terminate the float switch in a junction box as close as practical, and well above the liquid level in the tank or pit.

Where possible avoid running the float switch cable any appreciable distance through conduit, as this simply makes servicing, testing and eventual replacement more difficult. Most applications will only require the use of the common (blue) wire and either the black or brown wire. In all two-wire applications, insulate the end of the third, unused wire, as it will become live when the switch changes state.

In applications where two float switches are used in a control circuit, for example for the filling or pumping out of a deep tank, a relay must be used in the control circuit. A basic schematic diagram for this application is depicted in Fig 3. In Fig 3, a double pole relay is used to latch the circuit ON. The latch is broken by either the high level or low level float switch changing state, depending on whether the tank is to be emptied or filled. A suitable relay may be used to directly control the pump motor, however, it is preferable that the control circuit be operated at low voltage, and the relay contacts, set 1, used to control a suitable mains voltage contactor which in turn controls the pump motor.

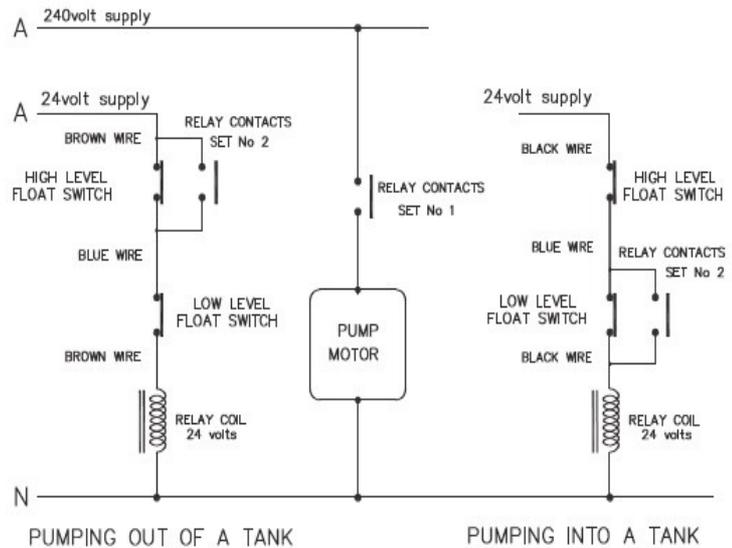


Fig. 3

ENVIRONMENTAL LIMITATIONS

Maximum submergence	30 Meters, 300 kPa 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	600 mm
Liquid level change for the switch to operate	300 mm (approximately)
Smallest opening through which the switch will fit	108 mm
Minimum distance between float and closest tethering point/cable weight	100 mm (See typical application)
Suitability for use in sodium hypochlorite	Fully compatible
Suitability for use in sea water	Fully compatible
Suitability for use in potable water	Fully compatible

HAZARDOUS APPLICATIONS

This float switch is classed as a simple device, it contains no mechanism for the production or storage of electricity. As such, it requires no separate certification to be used in hazardous environments. For such installations it is necessary to isolate the float switch via an intrinsically safe relay, a zener barrier.

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PLEASE NOTE: Kelco Engineering Pty Ltd reserves the right to change the specification of this product without notice. Users will use their own judgment to determine the appropriateness of using Kelco Products in an application, any safety measures required and that the product is properly installed for that application. To the extent permitted by law Kelco Engineering Pty Ltd disclaims and excludes all and any liability for the use of this product in any particular application or for defective installation. Kelco switches are warranted against malfunction by a 12 month return to base manufacturer's warranty. Full details of our warranty and limitation of liability can be found in this document or downloaded from: <http://www.kelco.com.au/warranty>

Warranty and Limitation of Liability

Thank you for purchasing Kelco Engineering Pty Ltd, (ABN 200 002 834 844) ("Kelco") products (*Kelco Products*). This document sets out the terms and conditions of the product warranty and Limitation of Liability for *Kelco Products*. It is an important document. Please keep it with your proof of purchase documents in a safe place for future reference should you need to lodge a claim.

This Warranty and Limitation of Liability (or any more recent version in effect when you purchase a *Kelco Product*) ("*Warranty*") applies to all *Kelco Products* regardless of where you purchased the *Kelco Products*.

When you place an order, you are deemed to agree to the *Warranty*, unless otherwise agreed in writing with *Kelco*.

Kelco is located at 9/9 Powells Road, Brookvale, NSW 2100, AUSTRALIA and may be contacted by calling 61 2 99056425 or emailing:

sales@kelco.com.au

1. Definition

The following terms used herein are defined as follows:

- (1) *Australian Consumer Law or ACL*: Schedule 2 to the Competition and Consumer Act 2010 (Cth).
- (2) *Brochures and Technical data sheets*: *Kelco* brochures, including, without limitation, sales brochures and technical data sheets, whether or not provided electronically.
- (3) *Customer Application*: Any application of *Kelco Products* or component parts by a you including, but not limited to, embedding and/or using *Kelco Products* in your parts/components, electronic substrates, devices, equipment and /or systems manufactured by customers.
- (4) *Non- Excludable Guarantee*: a Consumer Guarantee applicable to these *Warranty Terms* under the *Australian Consumer Law or New Zealand Consumer Guarantee Act 1993*.
- (5) *Fitness*: (a) fitness for a particular purpose, (b) performance, (c) compliance with laws and regulations and (d) conformity to standards of a *Kelco Product*.
- (6) *Kelco Products*: flow switches, level switches and float switches, related products and electronic/mechanical components under the *Kelco* brand.
- (7) 'You' or "Customer" means the purchaser of the *Kelco Products* not having purchased the *Kelco Products* for re-sale, and 'your' has a corresponding meaning.
- (8) *Usage Conditions*: Usage conditions, rating, performance, operating environment, handling instructions, warnings, restrictions on use, etc. of *Kelco Products* described in the *Brochures and technical data sheets*.

2. Descriptions

You are deemed to accept the following terms and conditions regarding the descriptions provided of *Kelco Products* in the *Brochures and technical data sheets* when you adopt or use a *Kelco Product* or component thereof.

- (1) Rated values and performance values are based on average performance established from batch production runs and *Kelco* does NOT warrant any rated values and performance values for multiple composite conditions.
- (2) Reference data is provided for your reference only. *Kelco* does NOT warrant that *Kelco Products* work properly at all times or continuously as provided in the reference data.
- (3) Application examples (if any) are provided for your reference only. *Kelco* does NOT warrant the *Fitness of Kelco Products* under such applications.
- (4) *Kelco* may discontinue the production of *Kelco Products* or change their specifications for the purpose of improving such products or for other reasons entirely at its own discretion and is under no obligation to notify you of any such change.

3. Precautions

You are deemed to accept the following terms and conditions when you purchase *Kelco Products*:

- (1) You will use *Kelco Products* in compliance with *Usage Conditions* including rating and performance.
- (2) You will confirm *Fitness* and use your own judgment to determine the appropriateness of using of *Kelco Products* in a *Customer Application*. *Kelco products* are unlike conventional flow and level switches and pump controllers in that they can be applied to virtually any fluid or pumping system in any manner defined by an original equipment manufacturer, a wholesaler or end user or their agents. The knowledge and experience of such parties is outside the control of *Kelco*, and their having relevant knowledge and experience is critical to the successful application and operation of the *Kelco Products*. *Kelco* does NOT warrant the *Fitness of Kelco Products* in a *Customer Application*.
- (3) You will confirm that *Kelco Products* are properly wired and installed for their intended use in your overall system. In the case of *Kelco* pump controllers, the flexibility of their operating system means it requires an extensive knowledge of pumps and their characteristics and the intended overall goal of the system in order to select the correct functions and settings. Failure to understand the ramifications of incorrect settings may result in a system that fails to perform to your expectations and or may even damage the pump or system itself. It is therefore critical that correct settings are used to achieve a stable and reliable overall system and to provide any such system with appropriate pressure and or flow protection the pump controller is intended to provide. *Kelco* does NOT warrant *Kelco Products* against defective installation, incorrect programming, incorrect wiring or electrical overload in any form.
- (4) When using *Kelco Products*, you will make sure to (i) maintain a margin of safety in relation to the published rated and performance values, (ii) design to minimize risks to any *Customer Application* in case of failure of any *Kelco Products*, such as introducing redundancy i.e. critical systems should include double redundancy of all controls, (iii) adopt system-wide safety measures to notify risks to users such as independent backup protection. Such backup may consist of a simple or complex independent alarm system to alert an operator to any issue with the system, and (iv) conduct regular maintenance on *Kelco Products* and the *Customer Application*.
- (5) It will be your sole responsibility as user to determine and use adequate measures and checkpoints to satisfy your particular requirements for (i) data input and output, (ii) maintaining a means for reconstruction of lost data, (iv) preventing *Kelco Products* installed thereon from being infected with computer viruses and (v) protecting *Kelco Products* from unauthorized access. *Kelco* shall not be responsible and/or liable for any loss, damage, or expenses directly or indirectly resulting from any third-party software or hardware not contained in the product as originally configured by the manufacturer, the infection of *Kelco products*, or any computer equipment, computer programs, networks, databases or other proprietary material connected thereto, by service attack, computer viruses, other technologically harmful material and/or unauthorized access.
- (6) *Kelco Products* are designed and manufactured as general-purpose products for use in general industrial products. They are not intended to be used in the applications described in subsection 3...(5)(a), (b), and (c). If you are using *Kelco Products* in the applications described below, *Kelco* does not provide any warranty for such *Kelco Products*, except for specific applications where *Kelco* has specified that it intends to provide a warranty or by separate written agreement between the customer and *Kelco*.

- a. Applications with stringent safety requirements and applications that could cause physical injury to a person or result in loss of life.
- b. Applications under severe conditions or in severe environment, including but not limited to outdoor equipment, equipment exposed to chemical contamination, equipment exposed to electromagnetic interference and equipment exposed to vibration and shocks.

- c. Applications under conditions or environments not described in any of the Brochures and Technical data sheets.
- d. *Kelco Products* are not intended for use in Hydrocarbons other than Dieselene.

4. Warranty

Kelco warrants that *Kelco Products* will perform in accordance with the specifications set out in the Technical data sheets, subject to and in accordance with the following:

(1) Warranty period: The *Warranty* shall apply for 12 months from the date of original purchase of *Kelco Products* by the customer. .

(2) Sole Remedy: Unless required to do otherwise as a result of statutory guarantees applicable under *ACL*, *Kelco* will provide, at its own discretion, either of the following two services as the sole remedy for a malfunctioning *Kelco Product*:

Repair of the malfunctioning *Kelco Product(s)* or components by *Kelco* or *Kelco* authorised dealer at no charge to the customer, or

- a. Replacement of the malfunctioning *Kelco Product(s)* or components by *Kelco* or *Kelco* authorised dealer with the same number of replacement/alternative products or components at no charge to the customer.

(3) Exceptions: This *Warranty* of *Kelco Products* does not apply if the cause of the malfunction falls under any of the following:

Usage in a manner other than the original intended use for the *Kelco Products* or component thereof.

- a. Usage other than as described in the *Usage Conditions*.
- b. Usage that is not in accordance with Section 2 (Descriptions) and Section 3 (Precautions) above.
- c. Modification or repair made to the *Kelco Products* by persons other than *Kelco*.
- d. Causes which could not have been foreseen with the level of science and technology at the time of shipping from *Kelco*.
- e. Replacement or repair of any (1) consumables (including cables, paddles and circuit boards), or (2) lost parts or accessories.
- f. Service of any product whilst it is outside Australia.
- g. Causes originating from other than *Kelco* or *Kelco Products* (including force majeure such as but not limited to natural disasters)
- h. Causes from any environmental factors. Such factors may include but are not limited to water or chemical ingress, fire damage, lightning damage, mechanical damage, sun damage or degradation, failure due to over-heating, freezing or vibration. Failure due to customers over tightening threads or fittings. Failure due to power supply fluctuations, surges, spikes, brown outs. or AC supplies that do not provide a pure sine wave output.
- i.

(4) If you intend to make a claim under this *Warranty* you must contact *Kelco* to register your claim by telephone on (02)99056425 and provide the following details to enable *Kelco* to assess the claim: (i) proof of purchase; (ii) evidence of the particulars of the claim that gives rise to the application of the *Warranty* ; (iii) confirmation that the cause of the malfunction was not an Exception set out above; and (iv) your phone number, email and address details.

You must provide or make the *Kelco product* available to *Kelco* for evaluation. If you are required to return the product to *Kelco* for repair replacement or evaluation, *Kelco* will provide delivery details and a return goods authorisation number to you. The *Kelco Products* will be at the owner's risk whilst in transit to and from *Kelco*, unless transported by *Kelco* or its authorised representatives.

The *Kelco Product* presented for repair may be replaced by refurbished products of the same type rather than being repaired. Refurbished parts may be used to repair the product.

To the extent permitted by law replacement of the product or a part does not extend or restart the *Warranty Term*.

Kelco may seek reimbursement of any costs incurred by them when the *Kelco* product is found to be in good working order.

5. Non-excludable Statutory Guarantees

(1) The *Warranty* is given by *Kelco* in addition to other rights and remedies which you may be entitled to under by law, nothing contained in this agreement excludes, restricts or modifies any condition, guarantee, warranty or other obligation which is applicable to or is conferred on *Kelco* pursuant to law where to exclude, restrict or modify any such condition, warranty or other obligation is unlawful. (2) Australia: To the extent that you are a consumer for the purposes of the *ACL*, *Kelco Products* come with guarantees that cannot be excluded under the *ACL*. You are entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure. "Acceptable Quality" and "major failure" have the meaning they have in the *ACL*. (3) New Zealand: For *Kelco Products* provided by *Kelco* in New Zealand, the *Kelco Products* come with a guarantee by *Kelco* pursuant to the provisions of the Consumer Guarantees Act, section 345(1)(i) of the Contract and Commercial Law Act 2017 and the Fair Trading Act. Where the *Kelco Product* was purchased in New Zealand for commercial purposes the Consumer Guarantee Act does not apply.

6. Disclaimer and Limitation of Liability

TO THE EXTENT PERMITTED BY APPLICABLE LAW:

(1) SELLER MAKES NO WARRANTY, EXPRESS OR IMPLIED, OTHER THAN AS STATED IN SECTION 4 ABOVE AND SELLER DISCLAIMS AND EXCLUDES ANY WARRANTY OF ANY OTHER KIND. (2) THE SOLE AND EXCLUSIVE REMEDY FOR MALFUNCTIONING KELCO PRODUCTS SHALL BE AS SET FORTH IN SECTION 4. ABOVE. (3) KELCO AND THE DISTRIBUTORS OF KELCO PRODUCTS ARE NOT LIABLE FOR ANY DAMAGES WHICH MAY ARISE FROM OR BE RELATED TO KELCO PRODUCTS.

7. Confidentiality: You accept that if you make a *Warranty* claim, *Kelco* and its agents may exchange information in relation to you to enable *Kelco* to meet its obligations under this *Warranty*.

8. Export/ Import Controls

Customers of *Kelco Products* shall comply with all applicable laws and regulations of Australia and/or other relevant countries with regard to security export/import control, when exporting/importing *Kelco Products* and/or technical documents or providing such products and/or documents to a non-resident of Australia. At its discretion *Kelco* may not provide customers with *Kelco Products* and/or technical documents should they fail to comply with such laws and regulations.

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