

INSTALLING AND OPERATING THE KELCO C25 INLINE FLOW SWITCH



WARNING

Please read these installation and operating instructions fully and carefully before installing or servicing this Inline Flow switch. The C25 inline flow switch is mains voltage device. Death or serious injury may result if this switch is not correctly installed and operated. All electrical work must be performed by a fully qualified and licenced electrician.

INSTALLATION

The C25 flow switch can be installed in any location in vertical or horizontal pipes. In vertical pipes flow can be either upward or downward through the switch. Where possible install a union on the inlet and outlet of the flow switch to allow easy removal for cleaning or servicing. Ensure the flow switch is oriented correctly to the direction of flow.

The male threaded end of the switch is the inlet. When installing make sure no thread tape or other material from the installation becomes entrained in the switch. Also ensure no foreign matter can enter the flow switch from tanks or pipework. Where scale or entrained material may be present always install a Y-strainer in the inlet pipe directly before the switch. Note that this flow switch operates magnetically and is therefore not suited to any application where iron or iron scale may be present in the process liquid.

The electrical module that saddles the flow switch body can be removed or loosened if required to allow the body of the switch to be screwed into tight locations, for example into the discharge port of a pump. To completely remove the electrical module undo the 4 self tapping screws that secure the two halves of the module together, the sealed electrical module then simply lifts off. Under no circumstances should the C25-R module be operated electrically under a high amperage load unless suitably attached to the flow switch body.

REFITTING ELECTRICAL MODULES

The electrical module of the C25 flow switch can be oriented to suit the application. It can be mounted in either direction on the switch body and can be rotated around the switch body to any required position. All modules are normally off switches that turn on in response to flow. Reversing the orientation of the electrical module does not reverse the action of the switch. To refit a module to the switch body, fit and tighten the 4 stainless self-tapping screws.

OPERATING LIMITATIONS

Many applications will benefit from a non-return valve in the pipework directly before the flow switch. This flow switch is not designed to operate as a one-way valve and rapid or high-pressure flow reversal may damage the piston in the switch. A simple non-return valve directly before the flow switch will reduce the possibility of damage due to flow reversal.

HOT LIQUIDS

This flow switch is suitable for use with hot or cold liquids up to 90°C continuous. Systems can be steam sterilized at 100°C for short periods without damaging the switch.

ELECTRICAL



WARNING

All electrical work associated with the C25 inline flow switch must be carried out by qualified electrical personnel and all electrical work must conform to AS/NZ (or equivalent) standards and to local wiring rules.

The C25 flow switches are available in one of two basic electrical configurations. There is a model number and an electrical rating on the inside of every switch. The electrical rating of the two types of modules is set out in the following table.



WARNING

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

ELECTRICAL DATA

| Electrical Module | Module Type | Contact Configuration | Switched Power Maximum | Switched Voltage Maximum | Switched Current Resistive AC (rms) | Inductive Loads (Power Factor 4.0) | Typical Application |
|-------------------|-------------------------|-----------------------|------------------------|--------------------------|-------------------------------------|------------------------------------|--|
| B | Dry contact reed switch | S.P.S.T Normally Open | 40Watts | 240V AC 200V DC | 1 Amp Maximum | Not Suitable | PLC Telemetry and relay logic circuits |
| R | Solid state switch | S.P.S.T Normally Open | 3kW 4HP | 5 to 240V AC | 10mA Minimum 40 Amps Maximum | 40 Amps at 240V | AC control circuits and motor control |

Note: The switched power of the C25-R module given above refers to a switch operating in a water pipe system at ambient temperature. The solid state switch built into the C25-R can tolerate locked rotor motor currents to 40 Amps continuous.

FLOW SENSITIVITY

Switching point and sensitivity to flow depends on the orientation of the switch, liquid velocity, viscosity and piston clearance. To give users as wide a choice as possible, a non-magnetic piston retainer is supplied with the C25 flow switch. With the switch mounted vertically and with flow passing upward through the switch, the non-magnetic piston retainer reduces the switch on flow rate by a factor of 6. That is, it makes the switch approximately 6 times more sensitive to flow.

Switching sensitivity can be greatly enhanced by using the non-magnetic retaining component however, the switch must be mounted in vertical position with the flow switch entry facing down. The piston and retaining components can be changed by removing the stainless steel Circlip, using long nose pliers.

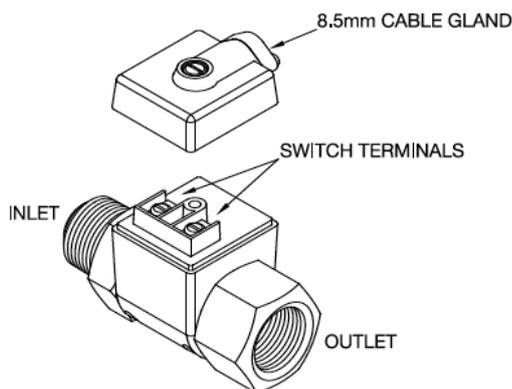
Standard Switch (as supplied) installed horizontally or vertically and with the magnetic piston retainer fitted

Switch installed vertically with flow passing upward through the switch body and with the non-magnetic piston retainer fitted.

| Switching Point on a Slowly Increasing Flow | Switching Point on a Slowly Decreasing Flow | | Switching Point on a Slowly Increasing Flow | Switching Point on a Slowly Decreasing Flow |
|---|---|--|---|---|
| 1.6 Litres per Minute | 1.3 Litres per Minute | | 0.28 Litres per Minute | 0.2 Litres per Minute |

Note : Maximum recommended flow rate through the C25 flow switch is 100 Litres per Minute

GENERAL LAYOUT



SERVICING

The C25 flow switch operates magnetically. The piston within the switch body should be a free fit and spring back to its off position as soon as flow stops. To test the flow switch push your finger into the inlet of the switch and press the piston back as far as it can go. When released, the piston should spring back freely. If the piston becomes jammed, it may require removal and cleaning.

Using a pair of long nosed pliers remove the spring Circlip located in the outlet port of the switch. Press the piston back with your finger, it should pop out along with its three finned magnetic spider. Ensure there are no pieces of iron scale adhered to the piston or spider and that both parts are free of damage. Reassemble the switch and test it to ensure the piston is a free and smooth fit. The C25-B flow switch can be tested electrically using a continuity tester. The switch should be initially off and switch on when the piston is pushed back. The model C25-R should only be tested with a lamp load on an AC supply.

The test lamp should light each time the piston is pushed back. If the C25-R is tested for continuity using an Ohms meter, a high resistance reading will be present across the switch terminals regardless of the ON or OFF state of the switch. This resistance is due to the solid state switch, and equates to a very small current leak present at all times across the contacts of the switch. The C25-R flow switch should not be used in AC applications that draw very small currents (<100mA), for example to drive electronic timers, as the load may remain in an on state regardless of the state of the flow switch, this effect is due to the small leakage current through the flow switch.

KELCO Engineering Pty Ltd

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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 of 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. The Kelco C25 is 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 *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 Dieseline.

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:

- a. Usage in a manner other than the original intended use for the *Kelco Products* or component thereof.
- b. Usage other than as described in the *Usage Conditions*.
- c. Usage that is not in accordance with Section 2 (Descriptions) and Section 3 (Precautions) above.
- d. Modification or repair made to the *Kelco Products* by persons other than *Kelco*.
- e. Causes which could not have been foreseen with the level of science and technology at the time of shipping from *Kelco*.
- f. Replacement or repair of any (1) consumables (including cables, paddles and circuit boards), or (2) lost parts or accessories.
- g. Service of any product whilst it is outside Australia.
- h. Causes originating from other than *Kelco* or *Kelco Products* (including force majeure such as but not limited to natural disasters)
- i. 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.

(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.