

Kelco F26 Series Flow Switches

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1. About this Publication

These instructions have been prepared according to the following standards:

- BS EN ISO 11442: Technical product documentation. Document management;
- BS EN ISO 12100: Safety of machinery - General principles for design - Risk assessment and risk reduction;
- BS EN 62023: Structuring of technical information and documentation;
- BS EN 82079-1: Preparation of instructions for use. Structuring, content and presentation. General principles and detailed requirements.

1.1. Safety Warnings and Symbols

The system of safety warnings and symbols is based on:

- BS EN ISO 7010: Graphical symbols. Safety colours and safety signs. Registered safety signs;
- BS EN 82079-1: Preparation of instructions for use. Structuring, content and presentation. General principles and detailed requirements.



This indicates a hazard with a high level of risk, which if not avoided, will result in death or serious injury if instructions, including recommended precautions, are not followed.



This indicates a hazard with a medium level of risk, which if not avoided, will result in death or serious injury if instructions, including recommended precautions, are not followed. In addition, there is a high risk of damage to the component, product or process.



This indicates a hazard with a low level of risk, which if not avoided, will result in minor or moderate injury if instructions, including recommended precautions, are not followed. In addition, there is a potential risk of damage to the component, product or process.

NOTE: Draws attention to important additional information.

1.2. Units of Measurement

Quantities are expressed in SI units or SI derived units; refer to J & E Hall International Standard JEH-ES-02 Guide to the International System of Units (SI).

1.3. Terminology

Terminology, abbreviations and acronyms are those currently in use throughout the refrigeration and air conditioning industry; refer to J & E Hall International Standard JEH-ES-01 Definition of Terms and Acronyms Used in the Refrigeration Industry.

1.4. Additional Copies

Obtain additional copies of these instructions from J & E Hall International; go to www.jehall.com.

2. Application

These flow switches can be used with liquids such as water, glycol solutions, or any fluid which is not harmful to the materials used in the construction of the switch.

The switch cannot be used where the fluid might freeze.

A typical application is to break circuit on flow decrease, prevent freezing in the evaporator by stopping the plant if the flow of cooled medium should fail for any reason.

Typical F26 flow switches from the range are illustrated in Fig 1.

The location of the flow switch and the model fitted can be found from the system schematic flow diagram and in Part A : Specification in Section 1 of the plant instruction manual.

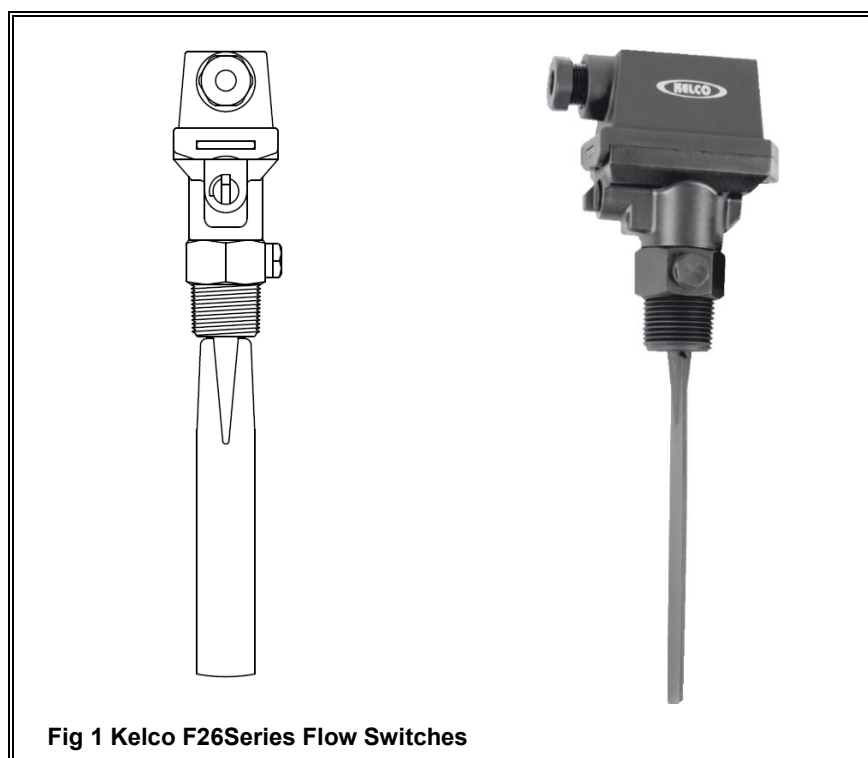


Fig 1 Kelco F26Series Flow Switches

3. Technical Data

Models Available		
Model	Switch and IP Rating	REMARKS
F26-S	15 Amp 500 V SPDT IP 67	Standard construction, all glass-reinforced polypropylene
F26-SS		316 stainless steel body and glass-reinforced polypropylene
F26-SB		Dezincification resistant brass body and glass-reinforced polypropylene
F26-D		Dezincification resistant brass body and nylon model for use in diesel fuel line applications
F26-H	20 Amp 500 V SPDT IP 67	Standard construction, all glass-reinforced polypropylene, heavy duty switch
F26-HS		316 stainless body and glass-reinforced polypropylene, heavy duty switch
F26-HB		Dezincification resistant brass body and glass-reinforced polypropylene, heavy duty switch

Table 1 Technical Data

Parameter	¹ F26-S F26-H	F26-SS F26-HS	F26-SB F26-HB	F26-D
Maximum operating pressure (static or dynamic) at ambient temperature	18 bar	200 bar	100 bar	
Maximum burst pressure at ambient temperature	45 bar	500 bar	250 bar	
Maximum operating temperature (liquid temperature)	¹ 60 °C	80 °C	80 °C	60 °C
Minimum operating temperature (liquid temperature)	-20 °C			
¹ Maximum operating pressure of the all polypropylene F26-S and F26-H flow switches must be linearly de-rated as operating temperature increases so that at a process temperature of 60 °C the maximum permissible operating pressure for the switch does not exceed 1 bar a.				
Table 2 Operating Limitations				

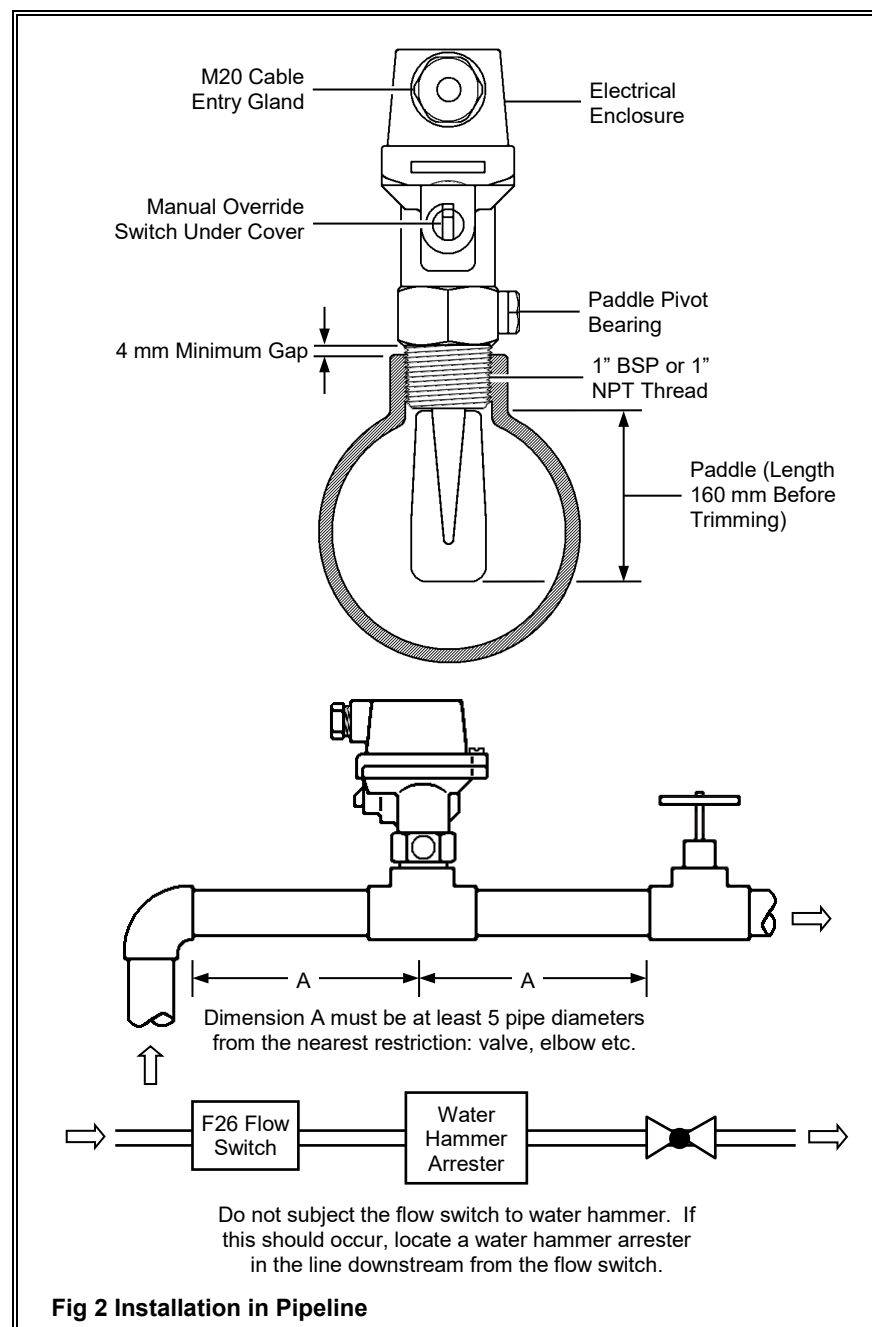
F26-S Flow Switches								
Rated Voltage	Non-inductive Loads				Inductive Loads			
	Resistive Load		Lamp Load		Inductive Load		Motor Load	
	NC	NO	NC	NO	NC	NO	NC	NO
125 V ac	15 A		3 A	1.5 A	15 A		5 A	2.5 A
250 V ac	15 A		2.5 A	1.25 A	15 A		3 A	1.5 A
500 V ac	10 A		1.5 A	0.75 A	6 A		1.5 A	0.75 A
8 V dc	15 A		3 A	1.5 A	15 A		5 A	2.5 A
14 V dc	15 A		3 A	1.5 A	10 A		5 A	2.5 A
30 V dc	6 A		3 A	1.5 A	5 A		5 A	2.5 A
125 V dc	0.5 A		0.5 A		0.05 A		0.05 A	
250 V dc	0.25 A		0.25 A		0.05 A		0.03 A	
F26-H Flow Switches								
Rated Voltage	Non-inductive Loads				Inductive Loads			
	Resistive Load		Lamp Load		Inductive Load		Motor Load	
	NC	NO	NC	NO	NC	NO	NC	NO
125 V ac	20 A		7.5 A		20 A		12.5 A	
250 V ac	20 A		7.5 A		20 A		8.3 A	
500 V ac	15 A		4 A		10 A		2 A	
8 V dc	20 A		3 A	1.5 A	20 A		12.5 A	
14 V dc	20 A		3 A	1.5 A	15 A		12.5 A	
30 V dc	6 A		3 A	1.5 A	5 A		5 A	
125 V dc	0.5 A		0.5 A		0.05 A		0.05 A	
250 V dc	0.25 A		0.25 A		0.03 A		0.03 A	
NC = Normally Closed NO = Normally Open								
Table 3 Electrical Data								

4. Installation

Locate the flow switch in a horizontal or vertical section of pipe with a straight run of at least 5 pipe diameters on either side of the switch; refer to Fig 2.

Do NOT install the switch adjacent to valves, elbows or an orifice.

Use a pipe union on each side of the flow switch to permit easy removal.



4.1. Paddle Length

The F26 flow switch is provided with a 160 mm long paddle suitable for flow sensing in large diameter pipes.

Usually, the paddle will require trimming to permit installation in smaller diameter pipes.

The paddle can be cut and shaped as required using tin snips or similar tools.

NOTE: The paddle can be cut both in length and, if required, in width.

The paddle must not touch the pipe wall or any restriction inside the pipe. Paddle length will depend on the application.

As a general guide, cut the paddle so that it extends to the centre line of the pipe or slightly past the centre.

If the flow rate is known to be high the paddle should be shortened in proportion, if the rate is known to be low increase the paddle length.

An online flow calculator is available at <http://www.kelco.com.au> to assist in determining the best paddle length for the application.

4.2. Pipe Connections

A 25 mm (1") BSP female thread socket must be provided.

This may be a tapping saddle, a pipe tee, or a socket welded directly to the pipe.

Whatever fitting is used, sufficient clearance must be allowed for the free movement of the paddle.

Normally a clearance to the full inside diameter of the 1" BSP thread will be required.

The flow switch can be installed in a 1" BSP socket attached to a short stand-off pipe at 90° to the main pipe.

This method increases the sensitivity of the switch to low flows due to the extra leverage against the tip of a longer paddle.

If this method of installation is implemented, extra clearance must be allowed for the free radial movement of the longer paddle.

When installing the flow switch in vertical pipework, note that the sensitivity of the switch will be different than in an horizontal application.

The switch will be slight more sensitive (detect lower flows) when the flow is downwards, slight less sensitive when the flow is upwards.

This is due to the effect of gravity and the dead-weight of the paddle itself.

This effect is more noticeable in larger pipe and low flows where longer paddles may be used.

Use thread tape or sealant and tighten the switch into the pipe socket using the spanner flats provided on the switch body.

CAUTION

To avoid damage, do not tighten the switch by grasping the enclosure, use the spanner flats provided.

Align the flow switch, square to the axis of the pipe with the flow arrow on the switch body pointing in the direction of flow.

Ensure that there is a minimum 4 mm gap between top of the threads on the flow switch and the top of the socket; refer to Fig 2.

4.3. Manual Override Switch

The F26 flow switch has a built in manual override switch, located under a snap-on cover on the end face of the flow switch, refer to Fig 3.

Use a small screwdriver blade in the small notch provided on the underside of the cover to remove it.

⚠ CAUTION

Do not under any circumstances pull or rotate the cover with pliers, as to do so will badly damage the switch.

The rotary toggle switch is marked AUTO and ON. In the AUTO position the flow switch responds solely to flow, in the ON position the flow switch is actuated regardless of the flow state, i.e. the switch is turned on.

The override feature is handy for testing and commissioning new systems.

For normal operation, rotate the switch fully to the AUTO position.

Do not operate the flow switch with the override partly between AUTO and ON as it is likely to malfunction.

4.4. Electrical Wiring

The F26 flow switch houses a magnetically coupled, high voltage, single pole, double-throw micro switch; two versions are available, refer to Table 2.

For terminals connections refer to Fig 3, for electrical data refer to Table 3.

In exposed locations ensure that the enclosure lid and cable gland are tightened securely and secondary precautions such as cable drip loops are employed to ensure the IP 67 protection rating of the switch is achieved.

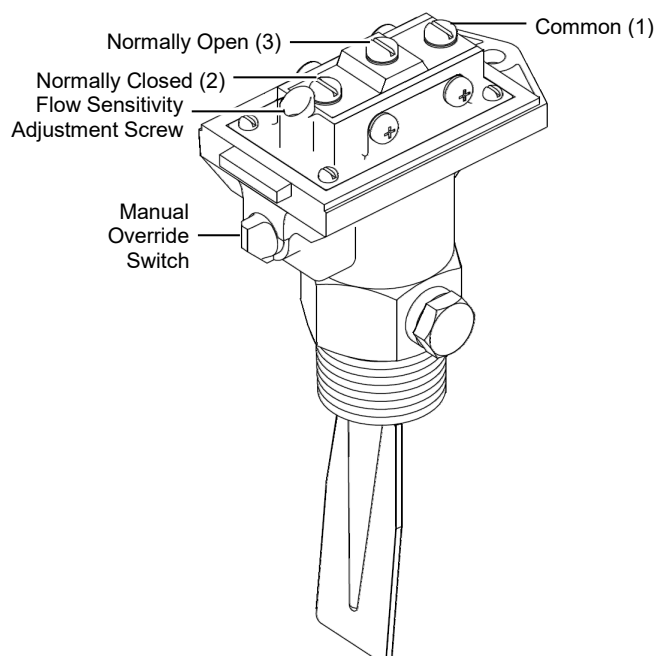


Fig 3 F26 Electrical Wiring, Terminal Designations

5. Maintenance

No routine maintenance is required other than periodically checking that the flow switch trips at the required flow rate.

6. Faults and Remedies

Some of the more common fault conditions are given in Table 4.

Fault	Remedy
Moisture inside the switch enclosure.	Check grommet in the conduit fitting, replace if damaged.
	Fluid leaking into the enclosure due to seal failure. Fit new flow switch.
Switch contacts fail to changeover or switch action is reversed.	Check switch operation. Check manual override switch is rotated fully to the AUTO position; refer to 4.3.
	Check the connections inside the enclosure and the interface with the control system. Wires should be securely fastened and properly insulated. Check wiring continuity.
	Check for cracked/broken paddle. Replace if necessary.
Table 4 Common Faults and Remedies	

7. New Components and Spare Parts

Obtain spare parts from the address below:

J & E Hall International	Telephone: +44 (0) 1332-253400
Hansard Gate,	Fax: +44 (0) 1332-371061
West Meadows,	Email: spares@jehall.co.uk
Derby,	Website: www.jehall.com
DE21 6JN	
England	

When ordering always quote the J & E Hall International contract number and the component serial number (if available).