Operating instructions

EN

Flow switch for wet sprinkler systems
Model FSFD, with adjustable time delay

SIGNALING UL LISTED

FM APPROVED



83795208.01 04/2022 EN

WIKA

Smart in sensing

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Declarations of conformity can be found online at www.wika.com.

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Prior to starting any work, read the operating instructions!Keep for later use!

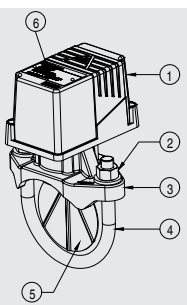
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1. General information

- The flow switch described in the operating instructions has been designed and manufactured using state-of-the-art technology. All components are subject to stringent quality and environmental criteria during production. Our management systems are certified to ISO 9001.
- These operating instructions contain important information on handling the instrument. Working safely requires that all safety instructions and work instructions are observed.
- Observe the relevant local accident prevention regulations and general safety regulations for the instrument's range of use.
- The operating instructions are part of the product and must be kept in the immediate vicinity of the instrument and readily accessible to skilled personnel at any time. Pass the operating instructions on to the next operator or owner of the instrument.
- Skilled personnel must have carefully read and understood the operating instructions prior to beginning any work.
- The general terms and conditions contained in the sales documentation shall apply.
- Subject to technical modifications.
- Further information:
  - Internet address: www.wika.de / www.wika.com
  - Relevant data sheet: FL 50.01

2. Design and function

2.1 Overview



① Case
② U-bolt, nut
③ Saddle
④ U-bolt
⑤ Plastic paddle
⑥ Product label

2.2 Description

The model FSFD is a vane-type flow switch for use in wet sprinkler systems. Water flow in the pipe moves the vane which generates a switching output, typically after a set delay. All switches are activated when a water flow of 10 gallons per minute (gpm) or more occurs but will not be activated when the flow is less than 4 gpm.

2.3 Terms used

Begriff	Erklärung
Maximum operating flow	The maximum flow with which the instrument can be used without changing the assured performance data.
Operating pressure	The maximum pressure with which the instrument can be used without changing the assured performance data.
Retard	The time delay between the paddle's response to the flow and the switching output. This delay is typically controlled by a pneumatic retard unit.

2.4 Scope of delivery

Flow switch, operating instructions, Allen key to open the case
Cross-check scope of delivery with delivery note.

3. Safety

3.1 Explanation of symbols

WARNING!
... indicates a potentially dangerous situation that can result in serious injury or death, if not avoided.

CAUTION!
... indicates a potentially dangerous situation that can result in light injuries or damage to property or the environment, if not avoided.

DANGER!
... identifies hazards caused by electrical power. Should the safety instructions not be observed, there is a risk of serious or fatal injury.

WARNING!
... indicates a potentially dangerous situation that can result in burns, caused by hot surfaces or liquids, if not avoided.

Information
... points out useful tips, recommendations and information for efficient and trouble-free operation.

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3.2 Intended use

The model FSFD was developed to detect flow in wet sprinkler systems once the sprinkler has been triggered. The pneumatic time delay can be adjusted on-site between 0 ... 70 seconds via an adjustment dial to avoid false alarms during water surges. The instrument can switch electrical loads of up to AC 250 V, 10 A.

WARNING!
Injuries due to incorrect application
Use in an incorrect application can result in considerable injury and damage to property.

- If the valves controlling the water supply to a sprinkler system are closed, the vane-type flow switches will not operate. All valves controlling the water supply to a sprinkler system should be sealed or locked in the normally open position. The normally open position should be monitored by a sprinkler system monitoring switch.
- Flow switches may not work, or may not work properly, if the sprinkler pipes being monitored are blocked with deposits from slurries, stones or other foreign objects. Sprinkler systems should be checked periodically for such blockages, following the instructions in chapter 5 of NFPA standard 13A.
- Only use the instrument in applications that lie within its technical performance limits (e.g. max. ambient temperature, material compatibility, ...). For performance limits, see chapter 9 “Specifications”.
- Flow switches are not a substitute for insurance. Building owners should always insure property and life which is protected by the sprinkler systems.

This instrument is not permitted to be used in hazardous areas!

The instrument has been designed and built solely for the intended use described here, and may only be used accordingly.
The manufacturer shall not be liable for claims of any type based on operation contrary to the intended use.

3.3 Improper use

WARNING!
Injuries through improper use
Improper use of the instrument can lead to hazardous situations and injuries.

- Refrain from unauthorised modifications to the instrument.
- Do not use the instrument within hazardous areas.
- Do not use the instrument with abrasive or corrosive media.

Flow switches monitoring wet sprinkler systems must not be used to discharge aqueous film-forming foam (AFFF), sprayed water or chemical suppression systems. Flow switches used for these applications can result in false readings caused by water surges, air pockets, etc.

Any use beyond or different to the intended use is considered as improper use.

3.4 Personnel qualification

WARNING!
Risk of injury should qualification be insufficient!
Improper handling can result in considerable injury and damage to property.

- The activities described in these operating instructions may only be carried out by skilled personnel who have the qualifications described below.

Skilled electrical personnel
Skilled electrical personnel are understood to be personnel who, based on their technical training, know-how and experience as well as their knowledge of country-specific regulations, current standards and directives, are capable of carrying out work on electrical systems and independently recognising and avoiding potential hazards. The skilled electrical personnel have been specifically trained for the work environment they are working in and know the relevant standards and regulations. The skilled electrical personnel must comply with current legal accident prevention regulations. Special operating conditions require further appropriate knowledge, e.g. of aggressive media.

3.5 Labelling, safety marks

Product label (example)

① Manufacturer's address
② Date of manufacture
③ Ingress protection
④ Electrical rating
⑤ Operating pressure
⑥ Flow rate
⑦ Pipe size
⑧ Article number
⑨ Serial number
⑩ Approvals

Before mounting and commissioning the instrument, ensure you read the operating instructions!

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4. Transport, packaging and storage

4.1 Transport

Check the instrument for any damage that may have been caused by transport. Obvious damage must be reported immediately.

CAUTION!
Damage through improper transport
With improper transport, a high level of damage to property can occur.
- ▶ When unloading packed goods upon delivery as well as during internal transport, proceed carefully and observe the symbols on the packaging.
- ▶ With internal transport, observe the instructions in chapter 4.2 “Packaging and storage”.

If the instrument is transported from a cold into a warm environment, the formation of condensation may result in instrument malfunction. Before putting it back into operation, wait for the instrument temperature and the room temperature to equalise.

4.2 Packaging and storage

Do not remove packaging until just before mounting.
Keep the packaging as it will provide optimum protection during transport (e.g. change in installation site, sending for repair).

Permissible conditions at the place of storage:
- Storage temperature: 0 ... 68 °C [32 ... +154 °F]
- Humidity: 35 ... 85 % relative humidity (no condensation)

Avoid exposure to the following factors:
- Direct sunlight or proximity to hot objects
- Mechanical vibration, mechanical shock (putting it down hard)
- Soot, vapour, dust and corrosive gases
- Hazardous environments, flammable atmospheres

Store the instrument in its original packaging in a location that fulfils the conditions listed above.

5. Commissioning, operation

Familiarise yourself with the following guidelines before installation:
- NFPA 72: National fire alarm and signaling code
- NFPA 13: Installation of sprinkler systems, section 3.17
- NFPA 25: Inspection, testing and maintenance of sprinkler systems, section 5.3.3.2
- Other applicable NFPA guidelines, local regulations and requirements of the competent authority

The manufacturer is not liable for claims due to faults resulting from improper installation of the instrument.

Tools: Cross-head screwdriver, 23 mm and 27 mm open-ended spanner, Allen key to open the case

5.1 Requirements at the measuring location

- The process pressure and flow must not exceed the specified maximum operating pressure and flow
- Permissible ambient and medium temperatures remain within the performance limits
- Protected from weather influences
- Protected against falling down
- The instrument must not be subjected to any external loading (e.g. use as a climbing aid, support for objects)
- Sealing faces are clean and undamaged
- Sufficient space for a safe electrical installation

→ For performance limits, see chapter 9 “Specifications”.

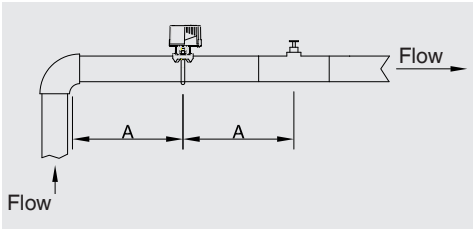
5.2 Mounting instructions

- Mounting is only permitted in the no-flow state. Reliably isolate the instrument from the flow system using the available valves and protective devices.
- Mount the flow switch in a horizontal or vertical pipe section with a straight run of at least 5 pipe diameters both upstream and downstream. The straight run should be free of bends, valves and other restrictions (→ see chapter “Installation requirements”).

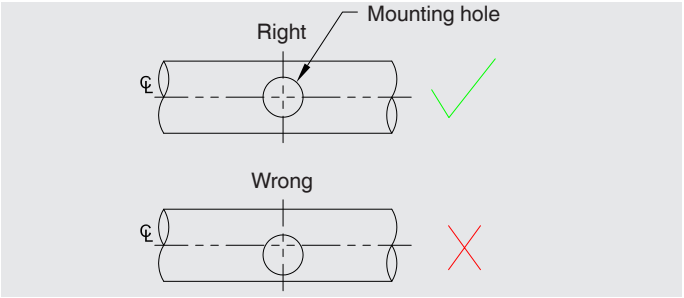
1. Using a keyhole saw and a slow drill, drill a hole in the corresponding stainless steel pipe, making sure that the hole is perpendicular to the centre of the pipe.
2. Remove burrs and sharp edges. Clean the pipe and remove any deposits and foreign objects from the pipe so that the vane can move freely. Clean the outside of the pipe to remove dirt and metal chips (→ see chapter “Installation requirements” and the table “Compatible pipes” in chapter 9 “Specifications”).
3. In the horizontal pipe section, mount the flow switch on the top or side of the pipe. Do not mount upside down, otherwise condensation may accumulate in the case and impair the function of the instrument. For vertical pipe sections, mount the flow switch on a pipe through which water flows upwards. Otherwise, the instrument may not function properly.
4. Turn the vane against the direction of flow and insert it into the hole without bending, cutting or kinking it. Insert the vane so that the arrow on the saddle points in the direction of the water flow and press the saddle firmly against the pipe (→ see chapter “Installation requirements”).
5. Install the U-bolt and tighten the nuts alternately with the required torque (→ see table “Compatible pipes” in chapter 9 “Specifications”). The paddle must not scrape or jam against the inside of the pipe.

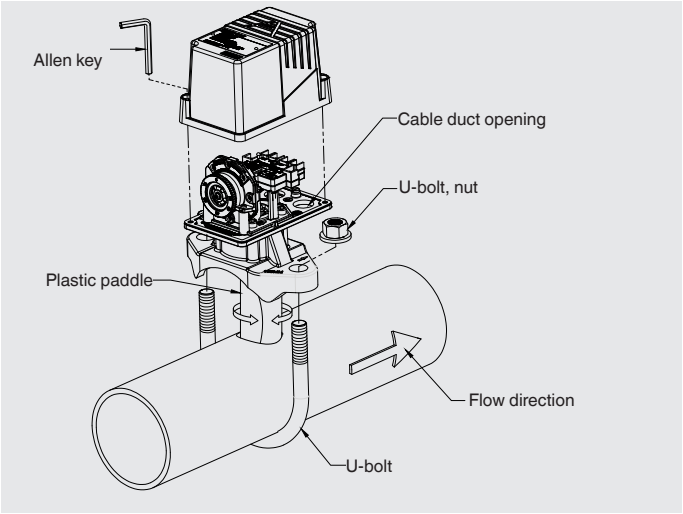
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Installation requirements



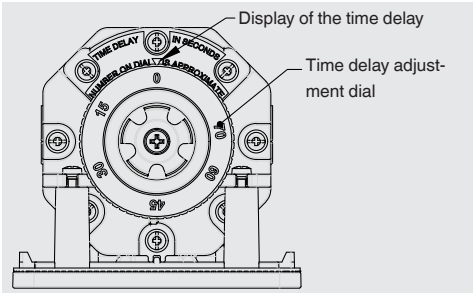
Length A must be at least 5 times the minimum diameter of the pipe away from the nearest restrictions (e.g. bends, valves).





5.3 Mechanical mounting

- Fill the pipe system and check for leakage.
- The pneumatic retard is factory preset to 30 seconds. By turning the adjustment dial it can be set from 0 to the maximum setting (70 seconds). Ensure that the time delay does not exceed 90 seconds.
- Set the delay to the minimum required to avoid a false alarm due to water surges.
- The areas marked in red must not be adjusted/opened.



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5.4 Electrical mounting

The connection cable must ensure basic insulation for external circuits. The instrument must be able to be completely de-energised via a switch or control unit.

DANGER!
Danger to life caused by electric current
Upon contact with live parts, there is a direct danger to life.
- ▶ The instrument may only be installed and mounted by skilled personnel.
- ▶ Switch off the load circuit before starting work and secure against being switched on unauthorised.

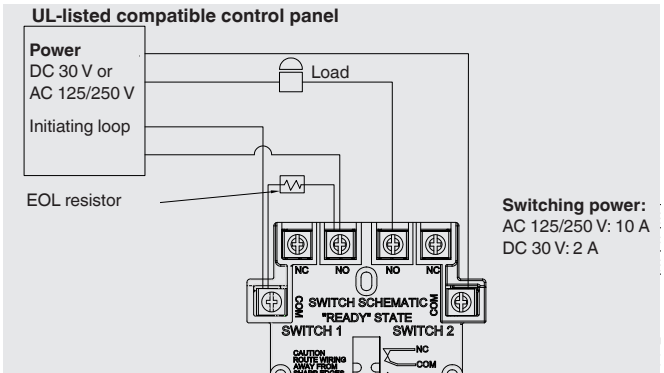
Cable preparation
- The cable gland used must be suitable for achieving an IP56/NEMA 4 ingress protection.
- Ensure strain relief for the installed cables.
- Size the connection leads for the largest current strength in the circuits and ensure sufficient UV resistance and mechanical stability.

Recommendation: 4-wire cable with conductor cross-section of 2.5 ... 4 mm^2. Provide wire ends with suitable insulated ring cable lugs.

Grounding
Include the ground connection in the inside of the instrument into the grounding concept of the application.

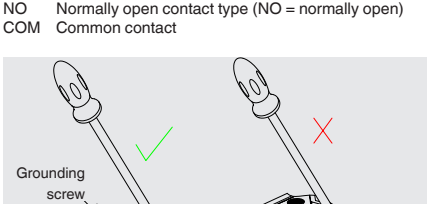
Clamping the cable
1. Open the case using the Allen key
2. Fit suitable cable gland (must correspond to IP56/NEMA 4 conditions) and feed in the cable
3. Carry out the terminal assignment of the two SPDT switches according to the switching function, tightening torque: Approx. 0.4 ... 0.5 Nm
4. If a second cable duct opening is required, remove the plug. To do this, hit a slotted screwdriver hard with a hammer to break through the back wall of the knock-out plug. Repeat the process on the opposite side until the plug falls out. Make sure that the instrument is firmly anchored (→ see figure below).
5. Close the case again and fix it with the 2 supplied screws

- Break into the wire as shown to check the connection.
- Do not allow the stripped cable to protrude beyond the switch enclosure.
- Do not loop the cable.
- Common and normally open contacts close when the vane is deflected, i.e. when water is flowing.
- Double switches allow the combination of applications in one single measuring instrument.



Legend

NC	Normally closed contact type (NC = normally closed)
NO	Normally open contact type (NO = normally open)
COM	Common contact



6. Faults

CAUTION!
Physical injuries and damage to property and the environment
If faults cannot be eliminated by means of the listed measures, the instrument must be taken out of operation immediately.
- ▶ Ensure that there is no longer any pressure present and the load circuit is switched off and protect it against being put into operation accidentally.
- ▶ Contact the manufacturer.

If a return is needed, please follow the instructions given in chapter 8.2 “Return”.

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For further information, see chapter 1 “General information”.

Faults	Causes	Measures
Contact is not switching in accordance with the specification at the set switch point/reset point	Electrical connection is interrupted	Carry out a continuity test on the electrical connection leads
	Wiring error, e.g. short-circuit	Check the pin assignment and correct it if necessary
	Electrical load unsuitable	Maintain the permissible electrical loads
	Contact contaminated	Replace instrument
Short-circuit	Moisture in the instrument	Only use in ambient conditions for which the ingress protection is suitable
Leakage at the flow switch	Wrong tightening torque of the U-bolt nuts	Take care to use the correct tightening torque (→ see table “Compatible pipes”)
	Dirt or foreign bodies under the saddle sealing	Clean the pipe surface and sealings before mounting
	Surface of the mounting pipe is not even	Ensure that the pipe mounting surface does not have any dents or defects
Instrument is not functioning correctly	Pipe is blocked by deposits or foreign bodies	Remove deposits or foreign bodies
	Flow port blocked	Replace instrument
Switching status remains unchanged despite reaching the switch point/reset point	Error with switch point setting	Carry out switch point setting with matching test assembly (→ see chapter 5.4 “Electrical mounting”)
	Contacts defective (e.g. fused contact zone)	Replace instrument Before recommissioning the new instrument, provide a protective circuit for the contact
	Flow port blocked	Replace instrument
	Leakage	Carry out a leak test Seal the process connection or replace the instrument

For the replacement of the instrument, observe chapters 8 “Dismounting, return and disposal” and 5 “Commissioning, operation”.

7. Maintenance and cleaning

7.1 Maintenance

Inspect the instrument every month.
There is no specific maintenance required, only a regular check and inspection.

7.2 Cleaning

WARNING!
Risk of burns
With cleaning there is a risk through hot surfaces.
- ► Before cleaning the instrument, allow it to cool sufficiently and use protective equipment if necessary!

CAUTION!
Physical injuries and damage to property and the environment
Improper cleaning may lead to physical injuries and damage to property and the environment. Residual media in the dismounted instrument can result in a risk to persons, the environment and equipment.
- ► Carry out the cleaning process as described below.

1. Before cleaning, correctly disconnect the instrument from the flow system and switch off the load circuit.
2. Use the requisite protective equipment.
3. Clean the instrument with a moist cloth.
   Electrical connections must not come into contact with moisture!

8. Dismounting, return and disposal

8.1 Dismounting

1. To avoid accidental water damage, all control valves should be closed and the system completely drained before removing or replacing the flow switch.
2. Turn off the power supply and disconnect the wiring.
3. Loosen the nuts and remove the U-bolt.
4. Carefully lift the saddle until you can reach the vane with your fingers.
5. Roll-up the vane and lift it out of the hole.

DANGER!
Danger to life caused by electric current
Upon contact with live parts, there is a direct danger to life.
- ► The dismounting of the instrument may only be carried out by skilled personnel.
- ► Remove the instrument once the system has been isolated from power sources.

WARNING!
Physical injury
When dismounting, there is a danger from aggressive media and high pressures.
- ► Observe the information in the material safety data sheet for the corresponding medium.
- ► Dismount the instrument when the flow is interrupted.

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8.2 Return

Strictly observe the following when shipping the instrument:
All instruments delivered to WIKA must be free from any kind of hazardous substances (acids, bases, solutions, etc.) and must therefore be cleaned before being returned.



WARNING!
Physical injuries and damage to property and the environment through residual media
Residual media in the dismounted instrument can result in a risk to persons, the environment and equipment.
- ▶ With hazardous substances, include the material safety data sheet for the corresponding medium.
- ▶ Clean the instrument, see chapter 7.2 “Cleaning”.

When returning the instrument, use the original packaging or a suitable transport packaging.

8.3 Disposal

Incorrect disposal can put the environment at risk.
Dispose of instrument components and packaging materials in an environmentally compatible way and in accordance with the country-specific waste disposal regulations.



Do not dispose of with household waste. Ensure a proper disposal in accordance with national regulations.

9. Specifications

Specifications	
Permissible temperature ranges	
Ambient	0 ... 68 °C [32 ... 154 °F]
Storage	0 ... 68 °C [32 ... 154 °F]
Ingress protection	IP56/NEMA 4, suitable for indoor and outdoor applications
Process medium	Water
Operating pressure	268 psi [18.5 bar] 1)
Switching function	2 x SPDT (single pole double throw), form C
Electrical rating	■ 10 A, AC 125/250 V ■ 2 A, DC 30 V res.
Electrical connection	Two inputs for 1/2" conduit

1) With UL346 the operating pressure is limited to 175 psi [12 bar] for pipe size 8 inch (DN 200).

For further specifications, see WIKA data sheet FL 50.01 and the order documentation.

Compatible pipes

Model	Nominal pipe size		Outer diameter in mm [inch]	Wall thickness		
	inch	mm		Light-weight wall in mm [inch]	Schedule 10 in mm [inch]	Schedule 40 in mm [inch]
FSFD 2	2	DN50	60.3 [2.38]	1.65 [0.06]	2.77 [0.11]	3.91 [0.15]
FSFD 2.5	2.5	DN65	73 [2.88]	2.13 [0.08]	3.05 [0.12]	5.16 [0.2]
FSFD 3	3	DN80	88.9 [3.5]	2.11 [0.08]	3.05 [0.12]	5.49 [0.22]
FSFD 3.5	3.5		101.6 [4]	-	3.05 [0.12]	5.74 [0.23]
FSFD 4	4	DN100	114.3 [4.5]	2.13 [0.08]	3.05 [0.12]	6.02 [0.24]
FSFD 5	5	-	141.3 [5.57]	-	3.4 [0.13]	6.55 [0.26]
FSFD 6	6	DN150	168.3 [6.63]	2.92 [0.12]	3.4 [0.13]	7.11 [0.28]
FSFD 8	8	DN200	8.63 [219.1]	-	3.76 [0.15]	8.18 [0.32]

Model	Bore size in mm [inch]	Tightening torque of the U-bolt nuts in Nm [ft/lb]
FSFD 2	$33^{\pm 2}$ [$1.3^{\pm 0.08}$]	45 [33]
FSFD 2.5		
FSFD 3	$50.8^{\pm 2}$ [$2^{\pm 0.08}$]	85 [63]
FSFD 3.5		
FSFD 4		
FSFD 5		
FSFD 6		
FSFD 8		

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