



USER'S GUIDE

INSTALLATION, OPERATION, MAINTENANCE INSTRUCTIONS



THERMAL DISPERSION FLOW SWITCH & FLOW MONITOR

CF22 - FLOW SWITCH / LEVEL SWITCH
CF520 - FLOW SWITCH MONITOR

www.sitron.com

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Introduction

The **CF22** Flow Switch models are designed to detect the flow of liquids and gases (air) in pipes or ducts. It utilizes Thermal Dispersion flow detection technology, which makes it very efficient for low or high flow detection. The **CF22** can also be used for liquid level detection with the sensitivity adjustment of the potentiometer.

The housing with viewing window (only aluminum G1 housing) gives the operator a switch status as well as: an 8 LED bargraph with flow rate indication and a central LED that indicates the switch detection status.

The connection and body are made of 316 stainless steel and can be coated for corrosive media.

Models:

CF22 / Liquids and Gases - Flow/Level switch SPDT Relay

CF520 / Liquids only - Ideal for liquid flow. Provides a 4...20mA analog signal and relay output (SPDT).

This technology is used to measure the velocity of the flow and is an ideal solution when a high level of accuracy is not needed and the user does not want to invest in more costly flow meters.

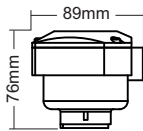
FEATURES

- Simple to install.
- Excellent low flow sensitivity.
- No moving parts-maintenance free reliability.
- Can be coated for aggressive mediums.
- Maximum working pressure of 1450 PSI (100 bar).
- Available in threaded, sanitary and adjustable insertion length connections.

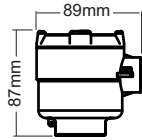


Models and Dimensions

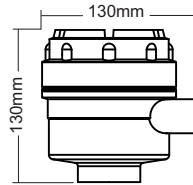
Nylon-N1



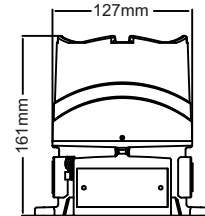
Aluminum-G1



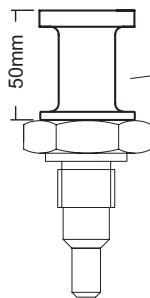
Aluminum-G2



Aluminum-GX

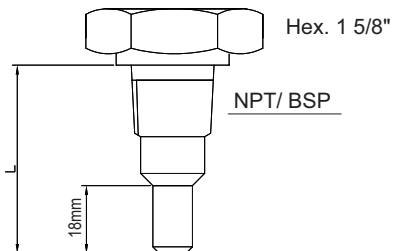


Extended Necks for Higher Temperatures

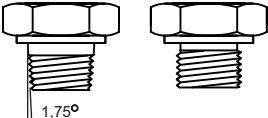


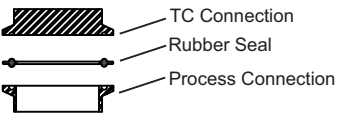
MT - Temperature up to 120°C



Insertion Length



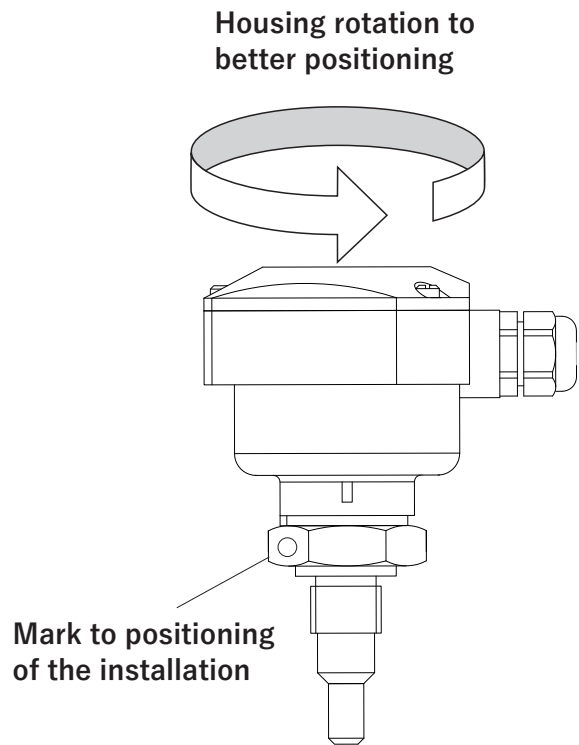
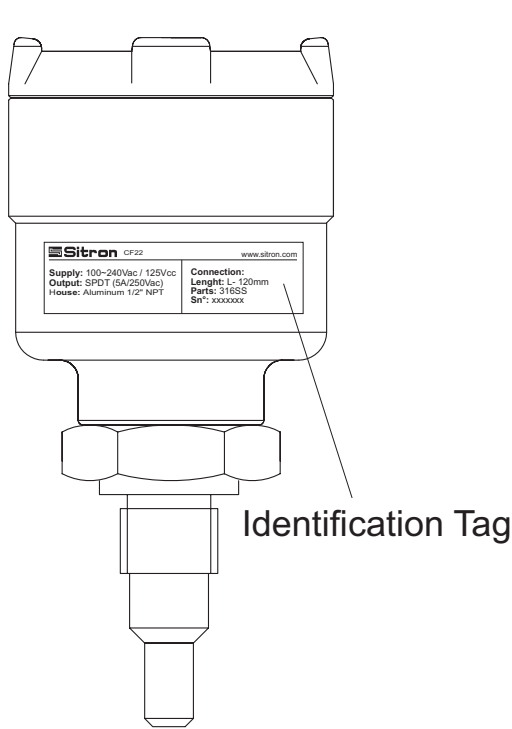
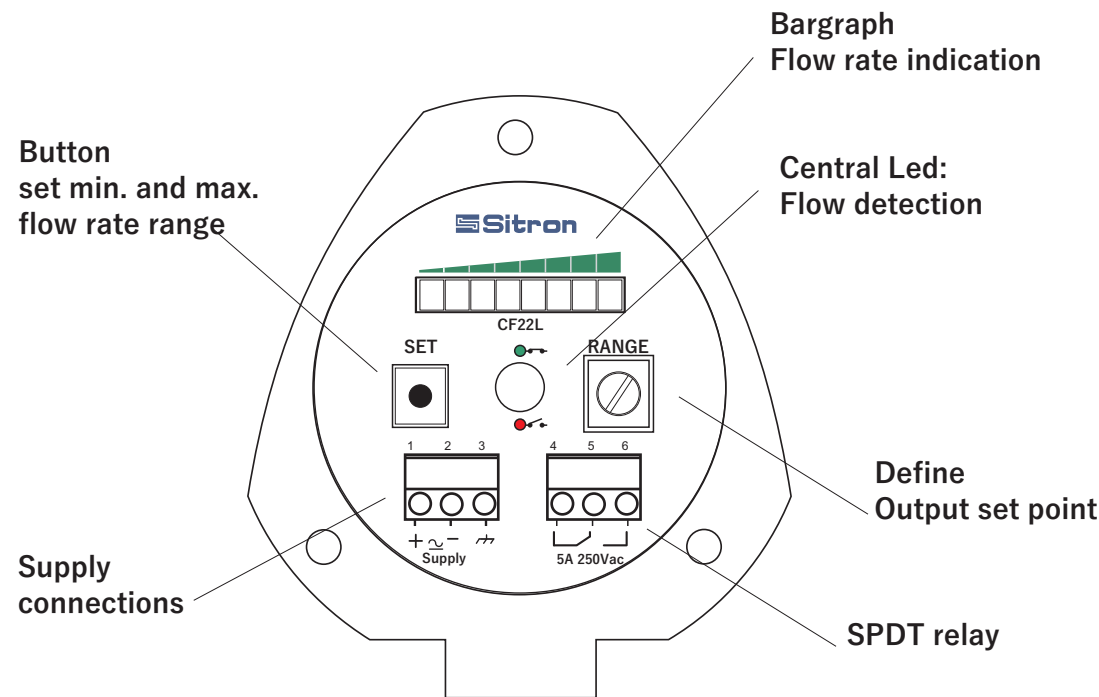
Process Connections

Threaded Connections		
1/2"	 NPT BSP	
3/4"		
1"		
1 1/2"		

Tri-Clamp Connection	
	 TC Connection Rubber Seal Process Connection
1 1/2"	
2"	
2 1/2"	

Flange Connections		ANSI 150# ANSI 300#
1"	FF	
1 1/2"		
2"	RF	
2 1/2"		

Overview



CF22 AC / DC

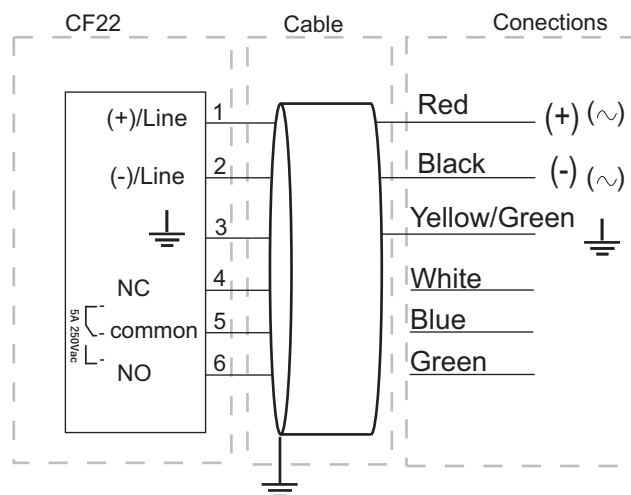
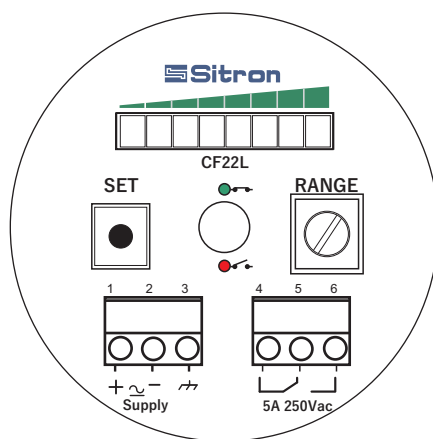
Before connecting the flow switch, check the identification label that contains information on supply voltage and contact capacity, etc.

Allow only authorized persons to make the proper connections as well as to avoid accidents.

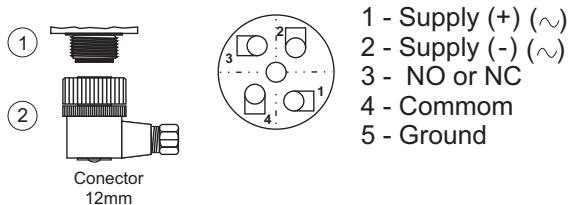
A suitable (stabilized) power supply will favor the life of the switch.

We recommend using shielded cables to eliminate interference from other instruments or machines in the field.

CF22 Relay



M12 connector



Electrical Connections CF22 - G2 and GX Housings

Before powering the switch, check the voltage, power supply, contact capacity, etc.

Allow only authorized persons to make proper connections as well as to avoid accidents.

A suitable (stabilized) power supply will improve the lifespan of the switch.

We recommend using shielded cables to eliminate interference from other instruments or machines in the field.

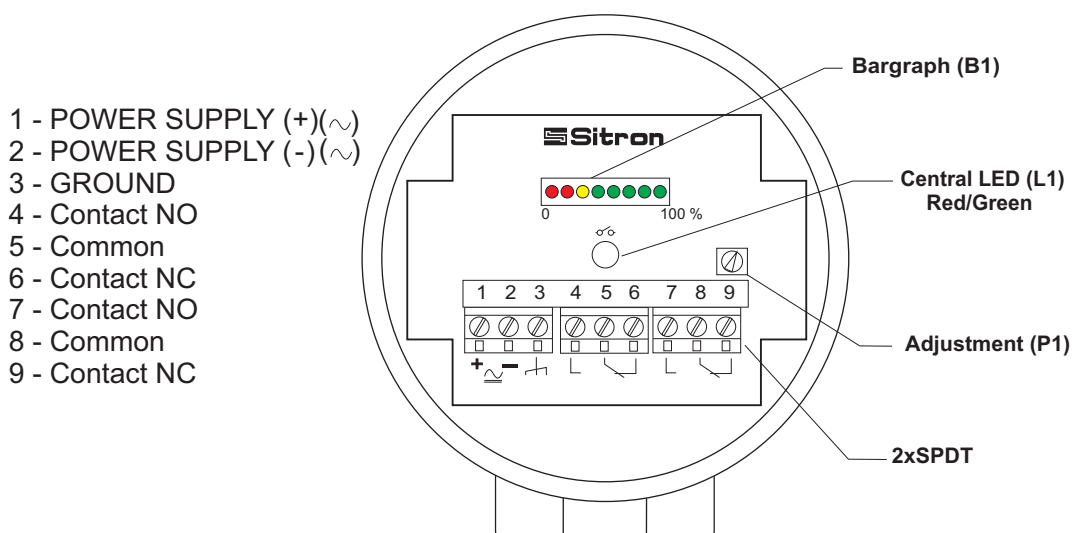
Check the switch model on the identification label and follow the connections as below.

(P1) - Set point adjustment

(B1) - Bargraph de 8 LED's: Red LED
Yellow (Set-Point) LED
Green LED

(L1) - Central Led - Green: With flow
Red: No flow

G2 and GX Electronics module



CF520 N1 / G1

Before powering the unit, check the voltage, power supply, contact capacity, etc.

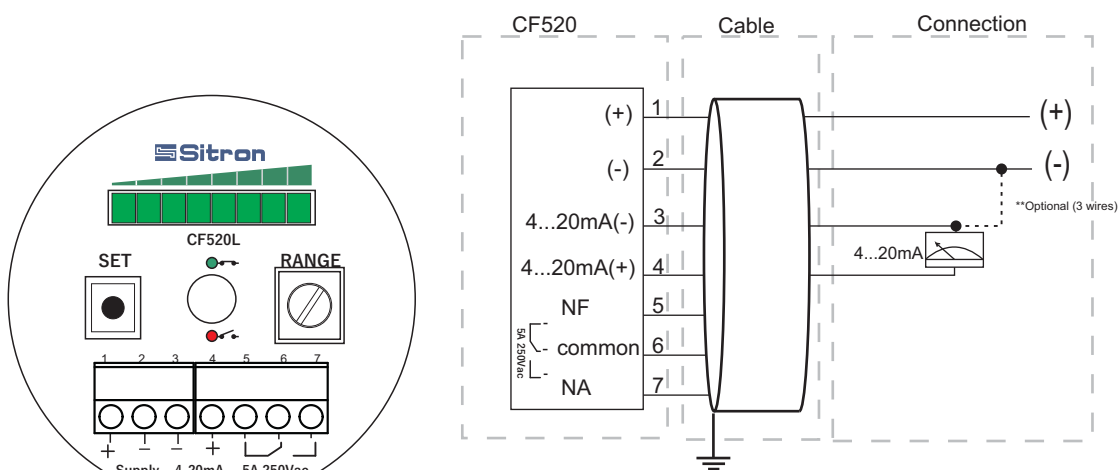
Allow only authorized persons to make proper connections as well as to avoid accidents.

A suitable (stabilized) power supply will improve the the lifespan of the switch.

We recommend using shielded cables to eliminate interference from other instruments or machines in the field.

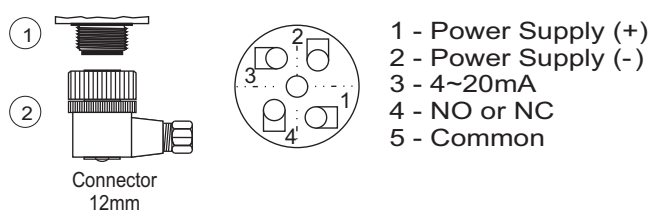
Check the switch model on the identification label and follow the connections as below.

CF520 Relay + 4~20mA

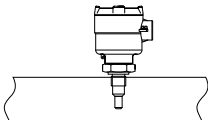
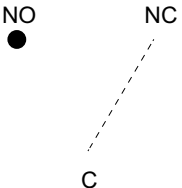
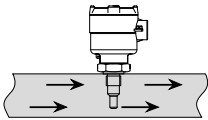
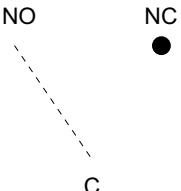


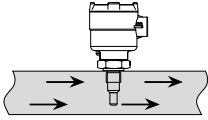
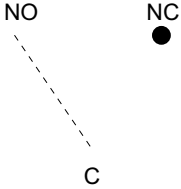
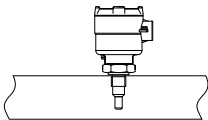
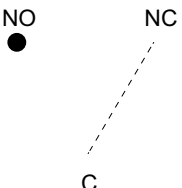
**** If you want 4~20mA (3 wires)
only use pin 4(+) / signal and pin 2 (-) / signal**

Connector M12 optional



Relay Status Guide

Application FSH	Condition	LED Status	Set Point	SPDT Status
	Normal	RED	OFF	
	Alarm	GREEN	ON	

Application FSL	Condition	LED Status	Set Point	SPDT Status
	Normal	GREEN	ON	
	Alarm	RED	OFF	

CF12 Calibration

To Start:

- 1 - Remove the enclosure lid (Note: the screws are self-retaining N1 Housing)
- 2 - Start the power supply and wait 5 minutes until the CF is active and has reached a stable point within the medium.
- 3 - Let the regular or desired flow reach its point of normal operation.

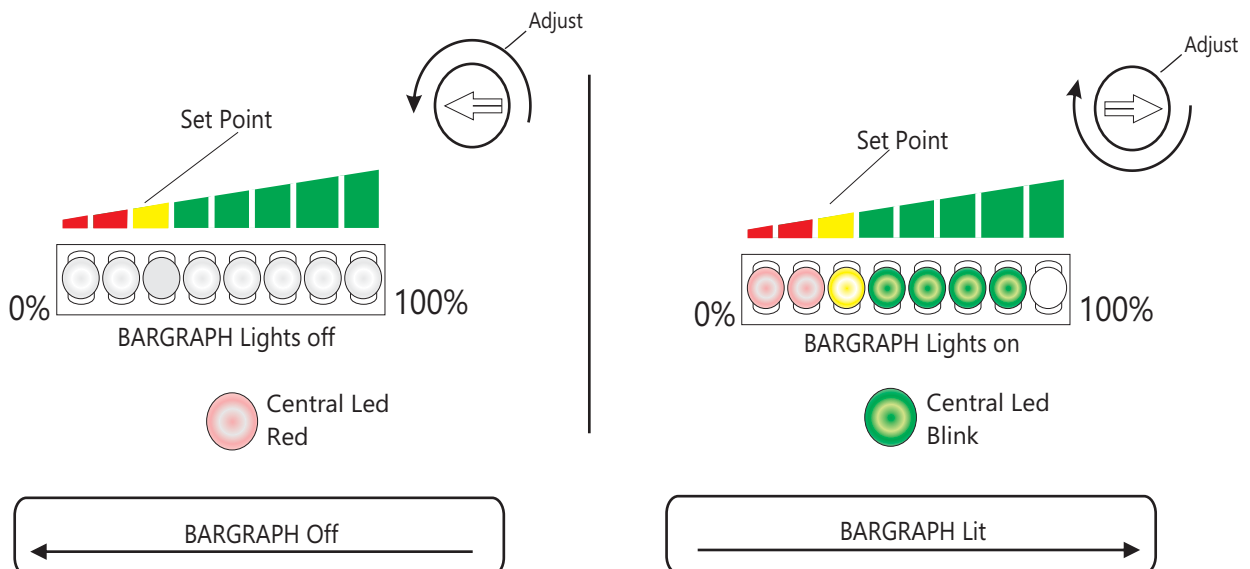
Calibration for Flow / No Flow:

- 1 - Set the flow rate at the normal range of operation.
- 2 - Turn the potentiometer counter-clockwise until the central LED turns red.
- 3 - With the central LED red, turn the potentiometer clockwise until the central LED changes to a blinking green state.
- 4 - Continue to turn the potentiometer clockwise until all green LEDs in the bar graph are on.
- 5 - In order to be sure that the adjustment is not at a critical state give the potentiometer an additional quarter turn clockwise.

Set Point Adjustment:

The flow switch can be adjusted to indicate either increasing flow, or decreasing flow at a specific set point within 3cm/s to 3m/s.

It is important to determine the specific set point at which the flow switch should activate or de-activate.



CF22 Calibration

Considerations:

When accessing the electronic module, be careful not to touch the energized parts of the supply and output. If necessary use an insulated screwdriver to access the Range Trimpot and SET button.

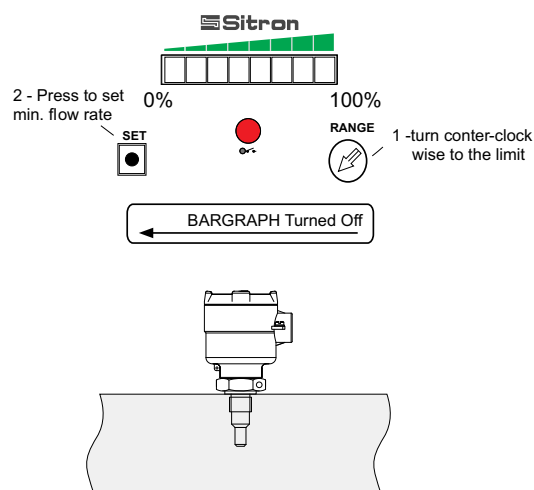
Detection Adjustment for CF22

- 1 - Open the cover
- 2 - Energize and wait 2 minutes for the flow switch to become active and stabilize.

Calibration for flow detection and non flow SET detection:

1- With the flow stopped, turn the trimpot «Range» counter clockwise until the limit.

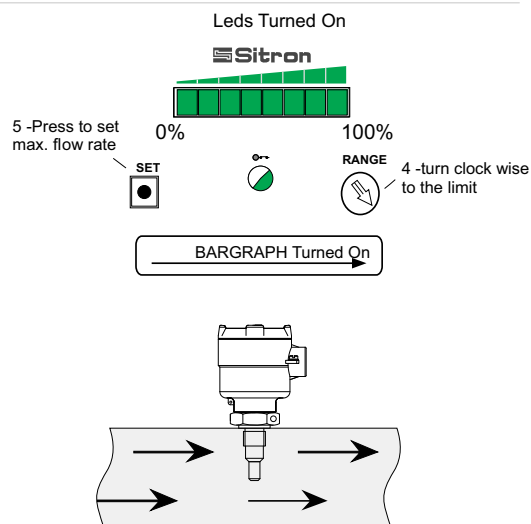
2 - Press and hold the «Set» button until the central LED starts to flash.
In this way we define the zero point (no flow).



3 - Establish the normal flow of operation wait about 30 sec. for the process conditions to stabilize.

4 - Turn the potentiometer clockwise to the limit.

5 - Press and hold the «Set» button until the central LED starts to flash.
In this way we define the maximum point (maximum flow)



CF520 Calibration

Considerations:

When accessing the electronic module, be careful not to touch the energized parts of the supply and output. If necessary use an insulated screwdriver to access the Range Trimpot and SET button.

CF520 Flow Monitor

Remove the cover.
Power the unit and wait 30 sec for the flow monitor to activate and stabilize.

1-With flow at minimum wait about 5min. For the process conditions to stabilize. Turn the «Range» trimpot counter-clockwise as far as it will go.

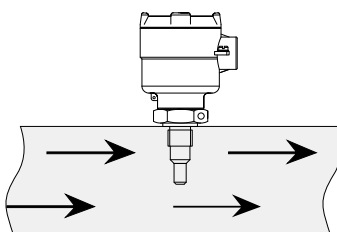
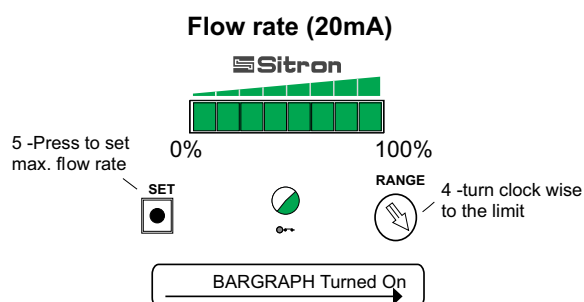
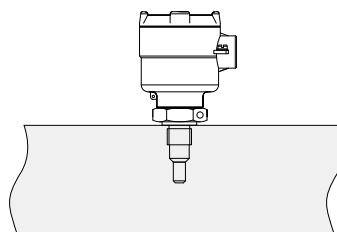
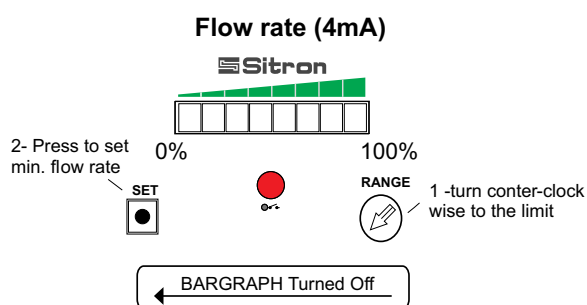
2-Hold down the «Set» button until the central LED starts flashing.

In this way we define the minimum flow 4mA.

3 - Establish the maximum operating flow, wait for about 30 sec. for the process conditions to stabilize.

4-Turn the potentiometer clockwise to the limit.

5-Hold down the «Set» button until the central LED starts flashing.
In this way we define the maximum flow at 20mA



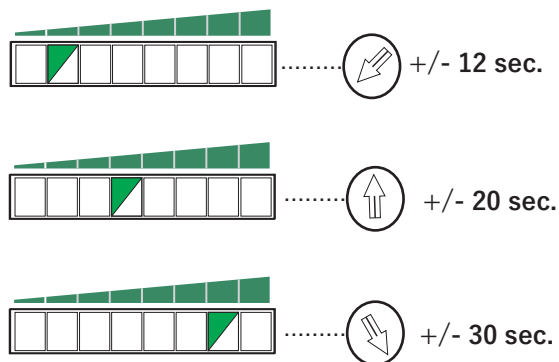
Set-Point Relay

Defining the relay output status:

The LED that keeps blinking defines the output state.

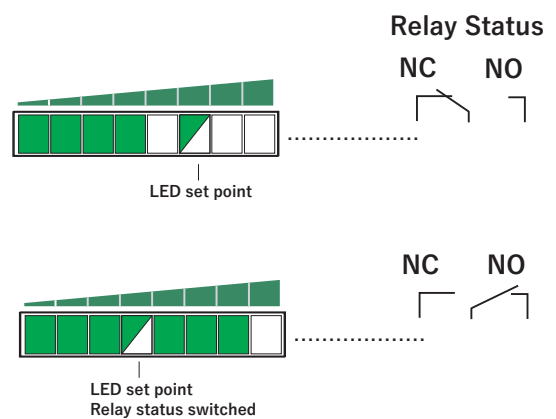
Use the «Range» trimpot to position the flashing LED at the desired point.

LED flashing.



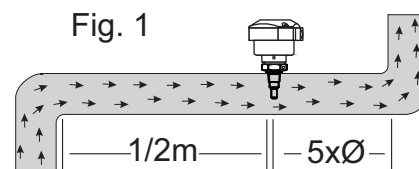
The flow detection time will depend on the set-point setting.

Example:
Bargraph Switch status



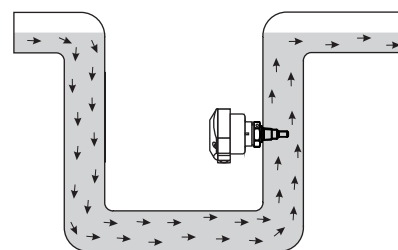
Pre-Installation Checks

1) Its recommended that the flow switch is installed with a distance of $\frac{1}{2}$ a meter of the pipe bent where the flow enters and 5x times the diameter of the pipe where the flow exits, enabling it to have an accurate reading (Fig. 1).



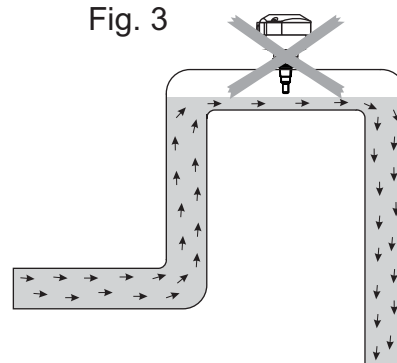
Verify that the installation point isn't near any connections, valves, elbows or anything similar, this can cause errors in the reading of the probe due to turbulence in the pipe.

Fig. 2



2) It is important that the flow switch is not installed at the highest point in the pipe run or in a location where there is the risk of air accumulating in the pipe. Keep in mind that the ideal mounting location is where the pipe is always full. This will ensure that the switch is always immersed in the flow. (Fig. 2 correct, fig. 3 incorrect)

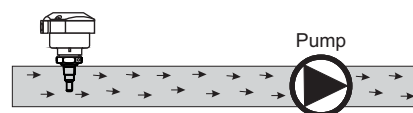
Fig. 3



3) In pipes that have pressure pumps or retention valves, we recommend that the probe be installed before the pump due to the fact that it will have less turbulence. (Fig. 4)

4) Confirm that the wire connections are correct and that the available power supply is compatible with the FSW unit.

Fig. 4



5) Verify that the operating pressure and temperature of the process corresponds to the operating parameters of the FSW unit.

More recommendations and handling instructions can be found on page 17.

Installation

The CF may be installed in a pipe using a “T” connection (see Fig.1) or inserted directly into the pipe (see Fig. 2). The user might need to adapt the installation so that it conforms to the following recommendations:

The CF is not affected by its fixed position so it may be installed at any angle around the pipe. However, we recommend that when the pipe is in a horizontal position the CF should be installed on the side, as long as the tip of the probe sits within the middle of the pipe (See Fig. 2).

When the pipe is in a vertical position, the CF should be installed only when the water flow is upward, which guarantees that the pipe will be full when in contact with the probe (See Fig. 3).

Care should be taken when installing the CF that the probe extends to the center of the pipe away from the internal wall and is fully immersed into the flow . (Fig. 4)

The reference point or logo inserted in the hex must be in the same direction of the flow (Fig. 5)

In pipes with smaller diameters use an adaptor to enlarge the diameter of the pipe so that the sensor can be properly installed (See Fig. 6). If the installation is not correct the CF's performance may be affected.

Fig. 1

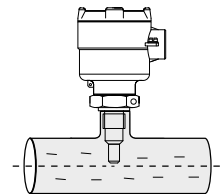


Fig. 2

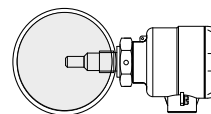


Fig. 3

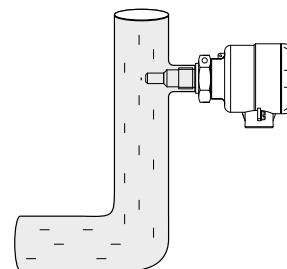


Fig. 6

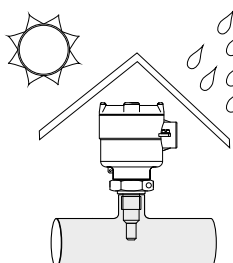


Fig. 5

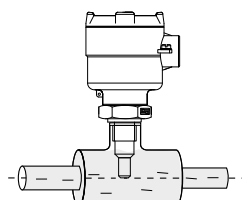


Fig. 4

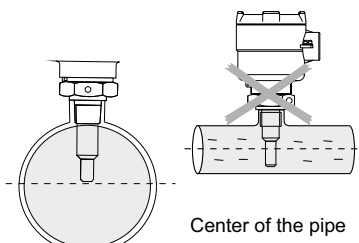
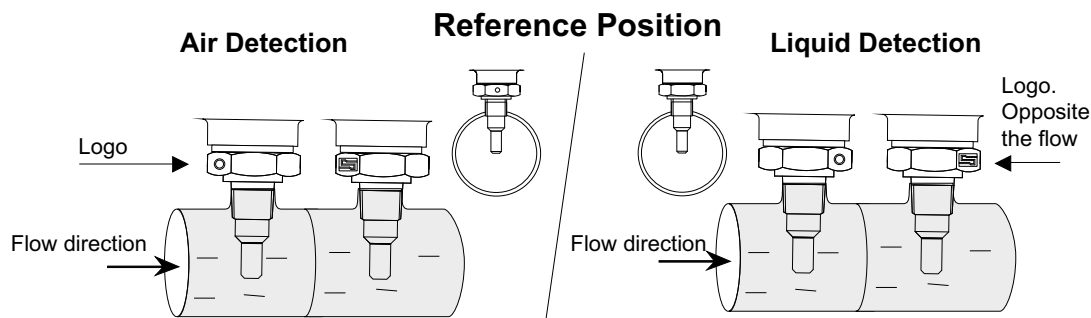


Fig. 7



Handling

Seal the thread with Te? on tape before installation (Fig. 1).

Do not turn or handle by the housing (Fig. 2).

A Use the correct tool during installation (Fig. 3)

The CF22 should not be dropped or suffer any impact or fall that could damage the electronics or the thermal tip of the probe (Fig. 4 and 5).

Periodic visual inspection of the CF22 is required to check for corrosion or deposit build-up. If deposits are found, clean the sensor to ensure optimum performance.

Care should be taken when handling and installing probes with coated rods to avoid scratching them.

Scratching the coating could interfere with the probe performance.

When cleaning the rod use a soft brush or any other similar object.

Class Protection. (Fig.6)

The efficiency of the degree of protection will depend on the type of cable clamped together with the Housing cover seal.

Use cable with an outside diameter of 6 to 12mm.
Ensure the cable is well sealed with hex tightening
Keep the slightly curved cable pointing downwards.

Fig. 1

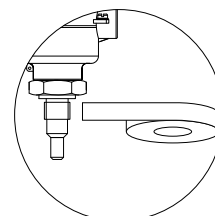


Fig. 2

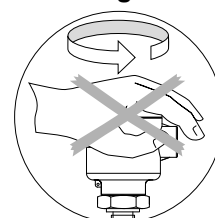


Fig. 3

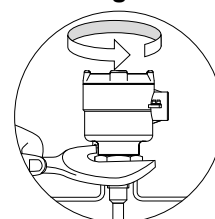


Fig. 4

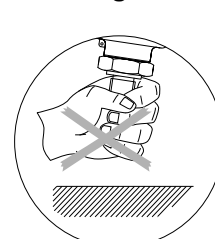


Fig. 5

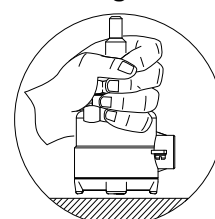
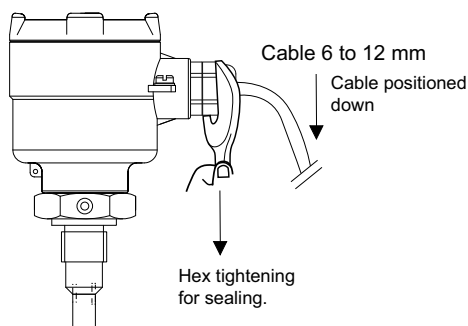


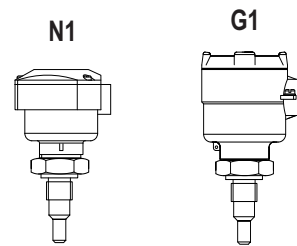
Fig. 6

Closed housing cover
pressing the sealing oring



Technical Specifications

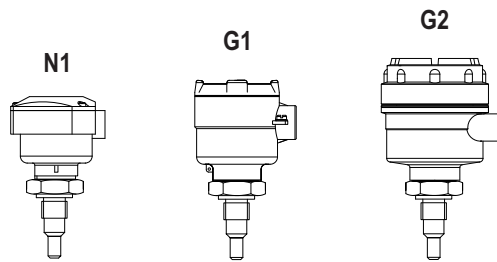
CF520



Application	Flow for liquids and gas level for liquids only
Operating Voltage	24Vdc (+/- 10%)
Current Consumption	+/- 100mA
Output	Relay(SPDT) 5A - 250Vac
Set Point Range	Liquid: 3 cm/s to 3 m/s - Gas: 5 cm/s to 5 m/s
Accuracy	+/- 10%
Repeatability	+/- 1% setpoint
Response Time	Detect 10 to 40s
Gradient Temperature	15°C/min
Flow Rate Indication	Bargraph 8 Led's Flow indication
Enclosure Material	Glass filled nylon (option - Aluminum / acrylic window)
Electrical Connection	Cable gland - 1/2" NPT conduit entry or M12 connector
Process Connection	BSP or NPT, adjustable, sanitary or flanged connections
Wetted Material	316 Stainless Steel
Operating Temperature	14 to 176° F (-10 to 80°C) sanitary option to 248°F (120°C)
Max Pressure	1450 PSI (100 Bar)
Class Protection	(IP 65)

Technical Specifications

CF22



Application	Flow for liquids and gas level for liquids only
Operating Voltage	24Vdc or 100-240Vac (50/60hz) & 125Vdc
Current Consumption	+/- 100mA
Output	Relay(SPDT) 5A - 250Vac (1 SPDT G1) (2 SPDT - G2) aluminum enclosure
Set Point Range	Liquid: 3 cm/s to 3 m/s - Gas: 5 cm/s to 5 m/s
Accuracy	+/- 10%
Repeatability	+/- 1% setpoint
Response Time	1 to 10s
Gradient Temperature	15°C/min
Flow Rate Indication	Red led - flow is below setpoint Yellow led - flow is at setpoint Green led - flow is above setpoint
Enclosure Material	Glass filled nylon / Aluminum painted
Electrical Connection	Cable gland w/ 2000mm cable, M12 connector or ½" NPT
Process Connection	½" to 1 ½" BSP or NPT, adjustable, sanitary or flanged connections
Wetted Material	316 Stainless Steel
Operating Temperature	14 to 176° F (-10 to 80°C) / extended neck to 248°F (120°C)
Max Pressure	1450 PSI (100 Bar)
Class Protection	IP 65 - (N1) IP 66 - (G1/G2)

Order Code

MODEL	
CF22AC	Flow Switch (1 SPDT) AC Power supply
CF22DC	Flow Switch (1 SPDT) DC Power supply
CF520DC	Flow Switch Monitor (1 SPDT + 4~20mA) DC Power supply

SIZE	
3	1/2"
4	3/4"
5	1"
6	1 1/2"
7	2"
8	2 1/2"
9	3"
A	1 1/4"
B	Metric Thread
0	4"
X	OTHER

PROCESS CONNECTION TYPE	
B	BSP
D	FLANGE ANSI 150# - Carbon Steel Painted
E	FLANGE ANSI 150# - 316 SS
F	FLANGE ANSI 150# - PVC
G	FLANGE ANSI 300# - Carbon Steel Painted
H	FLANGE ANSI 300# - 316 SS
J	FLANGE ANSI 300# - PVC
K	FLANGE ANSI 150# - 304 SS
L	FLANGE ANSI 300# - 304 SS
M	Metric Thread
N	NPT
R	SMS Female
S	SMS Male
T	TRI-CLAMP
Y	FEMALE DIN - 316SS
X	OTHER - SPECIFY

COATING	
S	NONE
H	HALAR [®] Coated only CF22

INSERTION LENGTH	
L35	35mm
L50	50mm
L75	75mm
L100	100mm
L	SPECIFY

HOUSING	
N1	SMALL ALUMINUM (1SPDT) 5A-250Vac
NE	SMALL ALUMINUM Encapsulated
G1	SMALL ALUMINUM (1SPDT) 5A-250Vac
GE	SMALL ALUMINUM Encapsulated
G2	LARGE ALUMINUM (2SPDT) 5A-250Vac W/ 2 X 3/4" NPT
GX	ALUMINUM W/ GLASS WINDOW (2 SPDT) 5A-250Vac (Ex d)
A3	SMALL 316SS W/ GLASS WINDOW (1SPDT) 5A-250Vac

ELECTRICAL CONNECTION	
7	CABLE GLAND W/ 1/2" NPT
8	CABLE GLAND W/ 1/2" NPT w/ 2m of Cable
9	2X 3/4" NPT (Female) Conduit
M	M12 Connector (NO or NC) only CF22
M20	M20 Metal cable gland
1	1/2" BSP Conduit (N1,G1)

OPTIONS	
MT	Medium Temp - 50mm 316SS Neck (80-120C)
ST	Identification Tag

CF22DC

4

G

S

L50

N1

7

MT

Small Problem Solutions

Fault	Cause	Solution
Relay does not change state.	LED off, no power	Check power supply
	LED doesn't change color	Check the installation (insertion length)
		Verify the calibration
Flow switch turns on or off suddenly	Radio frequency interference	Use armored cable and shielded housing
Relay remains closed	Sensor is potentially defective	Contact Sitron or your local representative for further instruction

Sitron's TERMS & CONDITIONS

Design: Sitron reserves the right to make any alterations or changes necessary to improve the Products, correct defects or to make the Products safer, without prior notice or consent by Buyer.

Pricing: All stipulated amounts shall be in US dollars and all prices quoted are valid for thirty (30) days from date of offer, unless otherwise stated.

Safety and Instructions: The Buyer ensures that it and all its representatives and agents will observe all safety and technical instructions in Sitron's operating manuals, catalogs or other directions or instructions (either written or verbal).

Delivery and Freight: All goods are sold FOB point of shipment, Brasil. Transportation to the destination is the Buyer's responsibility and Buyer alone shall bear the cost of freight, optional or other shipping requirements, and or insurance. Sitron shall not be liable for loss or damage to the Products after said Products are delivered to or received by the shipper/carrier, and all risk of damage or loss shall immediately pass to Buyer.

Receiving, unloading and storing of Products will be the responsibility of the Buyer.

Buyer also accepts that courier may choose to return Products to Sitron if any local taxes or duties are not paid by Buyer at point of delivery. Buyer must make any and all claims for corrections or deductions within ten days of the delivery of the Products.

Shipment Delays: Sitron has no control over the length of time shipments may be held at customs, etc. For this reason, Sitron commits only to a "shipment date", not a "delivery date". Buyer shall not hold Sitron liable for claims resulting from delay in shipment except in cases where these terms are accepted in writing by Sitron. Acceptance of delivery of Products by Buyer shall constitute a waiver of all claims for delay.

Partial Deliveries: While Sitron strives to deliver all orders on time and complete, Sitron reserves the right to make partial deliveries when necessary.

Changes: Any changes initiated by the Buyer which affects the products specifications; quantities ordered; delivery schedule; method of shipment or packing; or delivery location, must be made in writing and signed by both parties.

In this case, Sitron reserves the right to adjust the pricing and or delivery of the order, which will be agreed to by both parties before further work is performed on the order. Any such requests will be priced according to the scope of changes and the status of the current order. Customer must sign and return or acknowledge approval of drawings along with any Purchase Order. If approval drawings are not returned with order, the delivery date may be held or pushed back until Customer has acknowledged approval.

Cancellation: Any cancellation of the Contract by the Buyer shall be effective only if made in writing and accepted, in writing by the Sitron. In such a case, Sitron is entitled to reasonable cancellation charges including but not limited to labor, material and other related expenses.

Termination Fee Schedule:

Order entered but not released for manufacturing	10%
Order in any stage of production	75%
Order complete and ready for shipment	100%

Warranty: Sitron warrants its product against manufacturing defects in material and workmanship, when installed in applications approved by Sitron, for a period of one year from the date of original shipment, unless otherwise stated in writing by Sitron.

Sitron is not responsible for damage to Sitron's Products or other equipment or products because of improper installation or misapplication of the Products by Buyer. Installation or startup of Sitron's equipment must be performed under the guidelines set forth in Sitron's instruction manuals, wiring diagrams, etc., or performed under the direct supervision of Sitron's field technicians or Sitron's authorized Sales Representatives, in order to be covered by Sitron's warranty.

Sitron shall be under no liability in respect to any defect from fair wear and tear, willful damage, negligence, abnormal working conditions, failure to follow Sitron's instructions (whether written or verbal), misuse, modification or alteration or attempted repair of the Goods without Sitron's approval.

Sitron shall not be liable under the above warranty (or any other warranty, condition or guarantee) if the total price for the Products or the payment of Services rendered has not been paid by the due date for payment.

The Buyer must make all tools, resources or personnel available to help Sitron to diagnose the defect without any back charge. In absence of Buyer's cooperation in this regard, there shall be no liability under the above Warranty.

Sitron's liability under this warranty shall be limited to repair or replacement at Sitron's option of such defective Products, FOB factory, upon proof of defect satisfactory to Sitron. Warranty does not include transport.

Return Goods: No goods may be returned without Sitron's permission and an RMA number. Sitron assumes no responsibility for return shipments made without permission. In issuing credit for such shipments, Sitron reserves the right to charge a restocking fee dependent on Sitron's ability to recondition and resell the returned equipment.

Insurance: The responsibility for insuring the Goods after the risk in them has passed to the Buyer shall be that of the Buyer.

Confidential Information: All drawings, specifications, and technical information provided by either Buyer or Sitron shall be treated as confidential and shall not be disclosed to anyone other than those who require it as part of the fulfillment of the order. Buyer agrees that the designs and/or any other related material provided are and remain Sitron's exclusive property and that the Buyer acquires no right, title or interest to this intellectual property, whether in whole or in part.

Errors: Sitron reserves the right to correct all typographical or clerical errors or omissions, in its prices or specifications.

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