Sitron

USER'S GUIDE

Installation, Operation, Maintenance Instructions

CF420 / F420 & RCF420

Thermal Dispersion Flow Transmitter

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CF420/F420 & RCF420
Thermal Dispersion Flow Transmitter

The CF420 model is a flow transmitter that measures the velocity of the flow. It is ideal for use in measurement and control applications. The CF420 provides two output options; a 4-20mA output and a PNP ouput, the electronics module converts the signal from the probe to a 4-20mA analog output, which can be used to indicate flow rate. For the PNP output, the measured flow rate is compared to the set point value selected by the user and the switch changes state once the set point value has been achieved. This technology is often an ideal solution when the user needs to approximate flow rates but does not want to invest in higher cost flow meter technologies.

For application in small pipes, the F420 model is ideal. The sensor is separate from the electronics and is remotely controlled by the RCF420 flow switch relay. The F420 + RCF420 is the ideal solution when there is not a lot of space to install even a compact unit or when there is a need for a mounted relay with digital output.

A chain of 8 LED's gives the user a visual indication of the flow rate as well as set point status, and one di-chromatic LED indicates switch point status. In addition, if there is a problem with the unit, the 8 LED's will flash continuously providing troubleshooting information.

The sensing element and connection of the CF420/ F420 are made with 316 S.S .

All models can be ordered with a great variety of threaded, flange, or sanitary process connections.

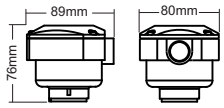
Features

- Simple to Install.
- No moving parts-maintenance free reliability.
- Fast response time.
- Can be coated for aggressive mediums.
- Maximum working pressure of 1450 PSI (100 bar) or (4500 PSI upon request).
- Avaliable in threaded, sanitary and adjustable insertion length connections.

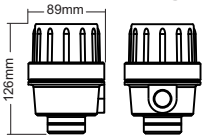
Models & Dimensions

Mounting Options for CF420

N1 housing

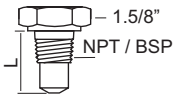


G1 housing



Insertion Lenght

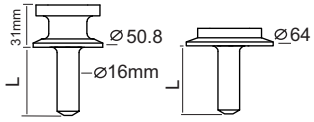
Standard



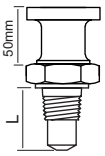
Tri-Clamp

TC 1/2"

TC 2"

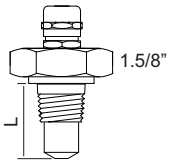


Neck for High Temperature

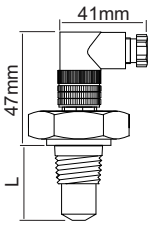


Mounting Options for F420 & RCF420

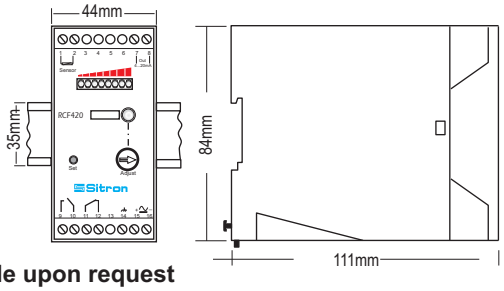
Cable Gland



M12 Connector



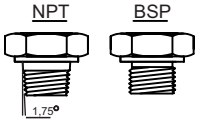
RCF420



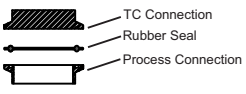
Other insertion lengths are available upon request

Process Connections

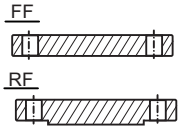
Threaded Connections
½"
3/4"
1"
1 ½"



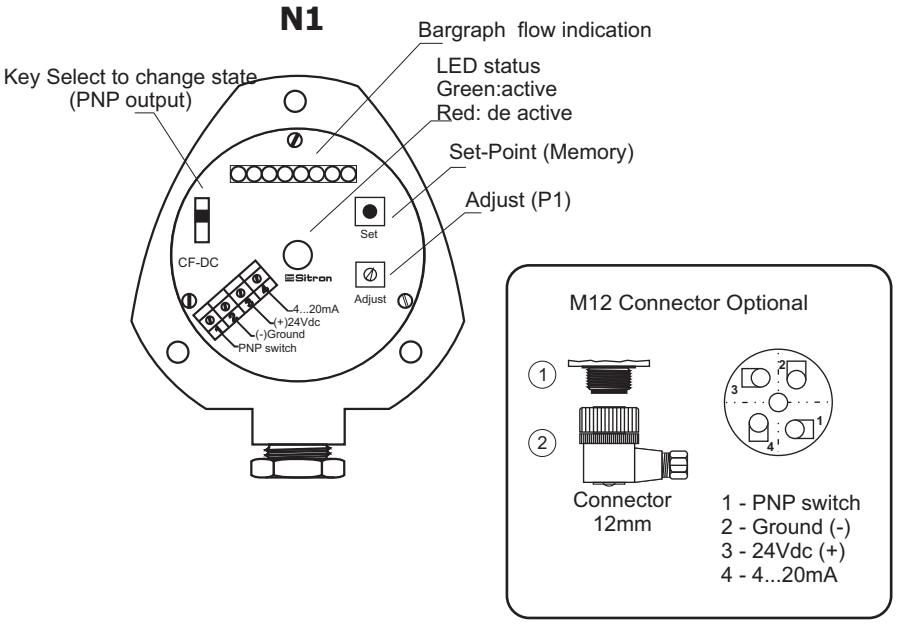
Tri-Clamp Connection
1"
1 ½"
2"
2 ½"

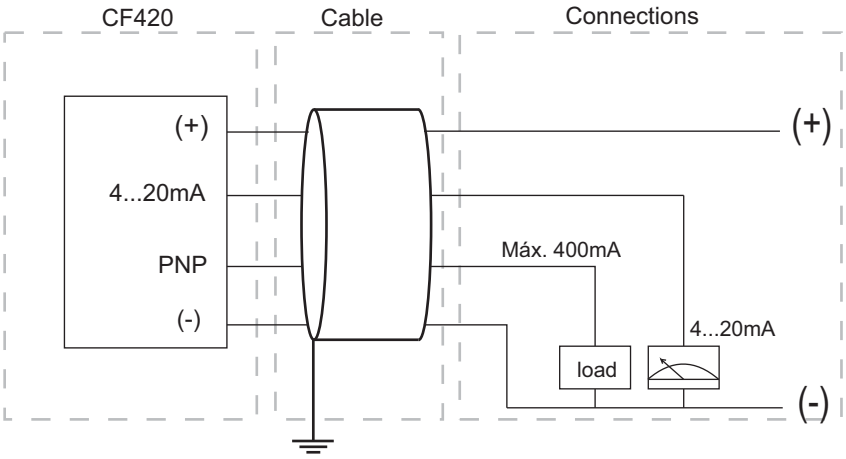


Flange Connections ANSI 150# ANSI 300#
1"
1 ½"
2"
2 ½"



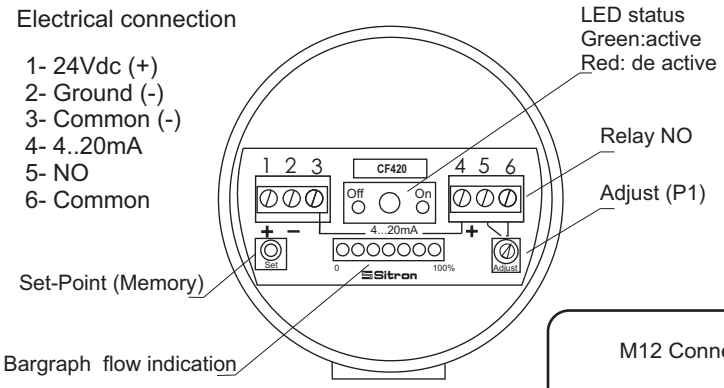
CF420 Nylon Housing (N1)

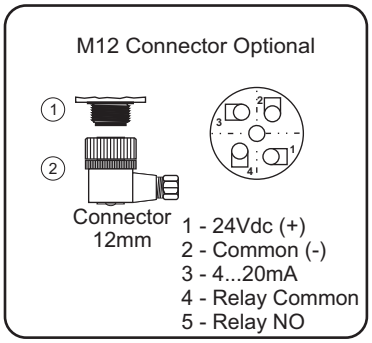




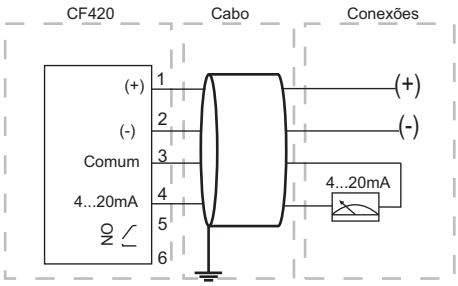
Wiring Diagram

CF420 Aluminum Housing (G1)

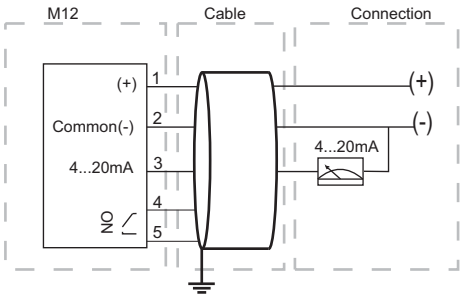




Standard

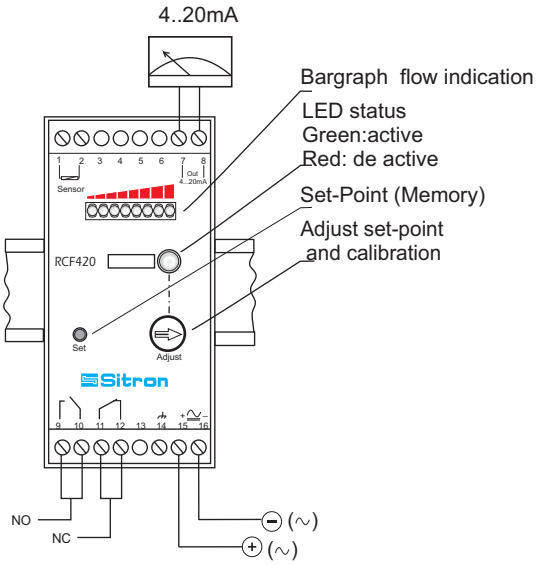


M12 connector

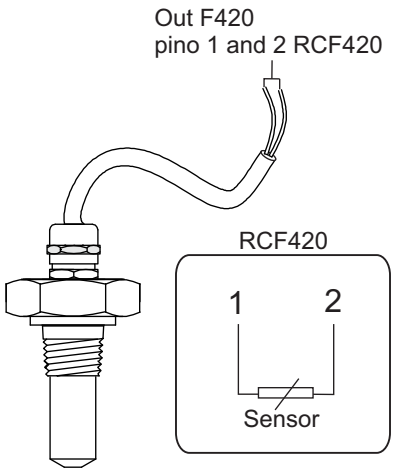


F420 and RCF420 Remote Controller

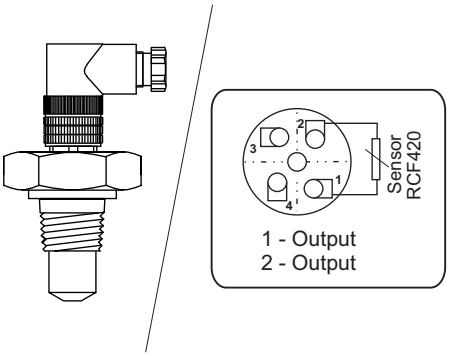
1.
2. Input F420
7.
8. Out 4..20mA
9.
10. NO contact
11.
12. NC contact
14. Ground
15. Power Supply (+)(∼)
16. Power Supply (-) (∼)



F420 - Cable Gland



F420 - M12 Connector

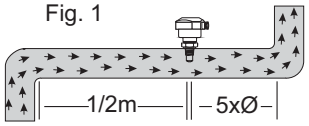


Pre-Installation

Pre-Installation Checks:

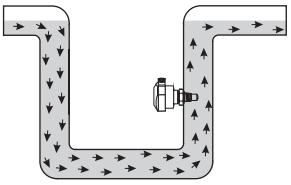
1) Its recommended that the flow transmitter is installed with a distance of ½ a meter of the pipe bend where the flow enters and 5x times the diameter of the pipe where the flow exits, enabling it to have an accurate reading (Fig. 1).

Fig. 1



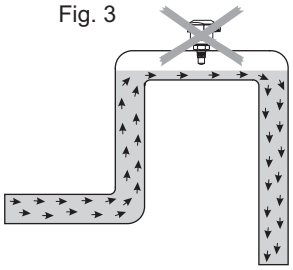
Verify that the installation point isn't near any connections, valves, elbows or anything similar. This can cause errors in the reading of the probe due to turbulence in the pipe.

Fig. 2



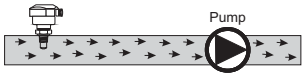
2) It is important that the flow transmitter is not installed at the highest point in the pipe run or in a location where there is the risk of air accumulating in the pipe. Keep in mind that the ideal mounting location is where the pipe is always full. This will ensure that the transmitter is always 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)

Fig. 4



4) Confirm that the wire connections are correct and that the available power supply is compatible with the CF420 unit.

5) Verify that the operating pressure and temperature of the process corresponds to the operating parameters of the CF420 unit.

When making connections between the controller and the probe use reliable cables and make sure they are grounded.
Shielded cables prevent interference and changes to the eletronic signal from the probe, improving and protecting against false measurements.
When possible, keep hand held communication equipment away from the CF420 and RCF420. If this unavoidable make a metal shield around the the flow switch and confirm that the unit has been properly grounded

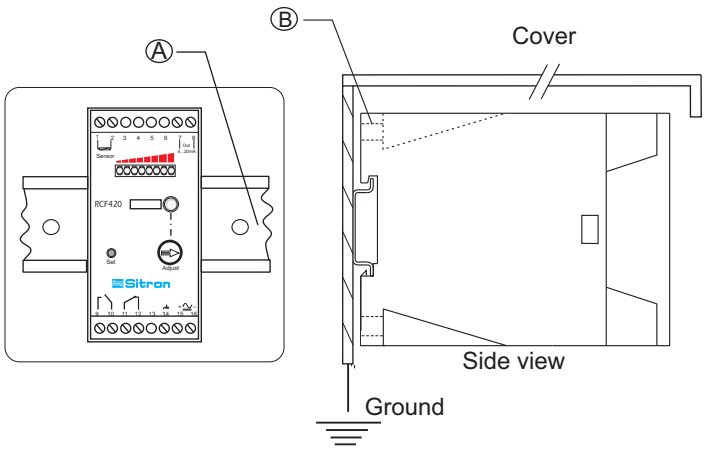
Do not install the controller in harsh environments and humidity. Respect class protection, working temperature and protect the unit from rain and excessive heat.
A stable Power Supply prevents equipment malfunction.

Controller Mounting

Panel mounting with the protection cover

A- DIN trail (35mm)

B- Screws



Installation:

The CF420 may be installed in a pipe using a “T”connection (see fig. 1) or inserted directly into the pipe (see fig. 2). The site might need to adapt the installation so that it conforms with the following recommendations.

Fig. 1

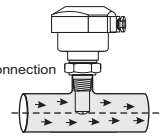
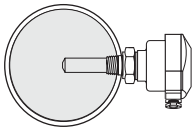
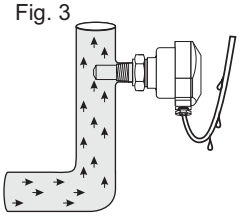


Fig. 2



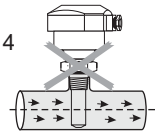
The CF420 is not affected by its fixed position so it may be installed at any angle around the pipe. However we recommend that when the pipe is in a horizontal position the CF420 should be installed on the side, as long as the tip of the probe sits within the middle of the pipe.
(See Fig. 2).

Fig. 3



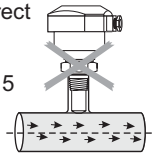
When the pipe is in a vertical position, the CF420 should be installed only when the water flow is upward.
Ensure that the conduit is facing downward and makes a U-turn on the bottom of the cable to avoid or moisture from entering the housing enclosure (See Fig. 3).

Fig. 4



Incorrect

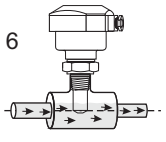
Fig. 5



Care should be taken when installing the CF420 that the probe extends to the center of the pipe away from the internal wall and is fully immersed into the flow (Fig. 4 and 5 incorrect, Fig.1 and 2 are correct).

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 CF420’s performance may be affected.

Fig. 6



CF420 and RCF420
Adjust 4..20mA

Adjustment 4mA

1) - Remove the housing cover (for CF420 model). (Note; the screws are self-retaining.)
2) - Start the power supply and wait 2 minutes until the CF420 is active and can achieve a stability point. During start-up of the CF420, the central flow LED will blink yellow.
3) - Let the regular or desired flow rate achieve its point of normal operation.
4) - With the pipe completely fully of medium and no flow (velocity = 0), turn the potentiometer totally counter-clockwise to its far left-hand stop to adjust 4mA (fig.1).

   Note: Any air gaps will cause inaccuracies in the measurement of the fluid velocity.
5) - If the process requires a 4/20-mA output with low flow, just maintain this flow during calibration remembering that this value can shift up to 25% from the 0.04 range.
6) - Press the SET button to store the value.
7) - The central flow LED will blink green for a few seconds. Wait until it stops blinking and turns red. Note: If any error occurs (i.e. the LED doesn't blink) press SET button again.

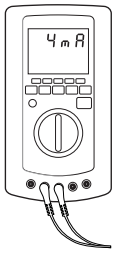
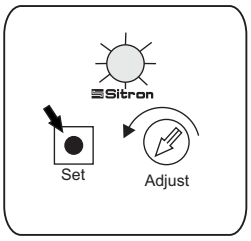


Fig.1



Use the following formula to check that the process velocity falls into this measuring

Range:

V = velocity (m/s)

Q= flow rate (m^3/s)

D= internal pipe diameter (m)

$$V = \frac{1.27 \times Q}{D^2}$$

Calibration

Adjustment 20mA

8) - Start up the flow in the pipe. The flow velocity range must be over 75% of the 0.04 range.

9) - Turn the potentiometer clockwise to its far right hand stop to adjust 20 mA (Fig.2).

10) - Press the SET button to store the value.

11) - The central flow LED will blink green for a few seconds. Wait until it stops blinking and turns red. At this point, the chain of 8 LEDS will be on. Note: If any error occurs (i.e. the LED doesn't blink) press the SET button again.

12) - After calibrating the CF420, adjust the potentiometer to the desired switch point .

13) - Use the chain of 8 LEDS to find the correct switch point which is can be activated by the blinking LED(Fig.3).

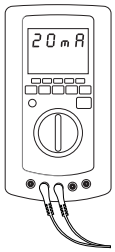


Fig.2

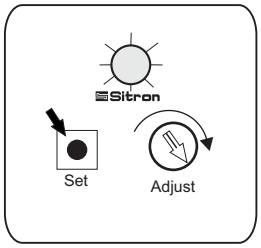
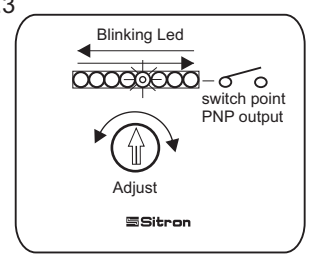
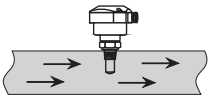
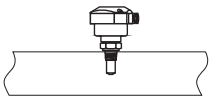


Fig.3

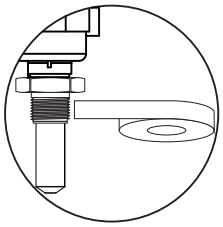


PNP output Status Guide

Key position	Condition	Output PNP	Green LED	Red LED
	 Flow	Actuated	ON	OFF
	 No flow	Actuated	OFF	ON

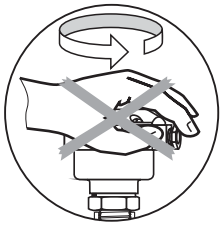
Seal the thread with Teflon tape before installation (Fig. 1).

Fig. 1



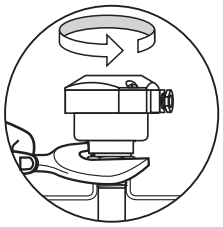
Do not turn or handle by the housing (Fig. 2).

Fig. 2



Use the correct tool during installation (Fig. 3)

Fig. 3



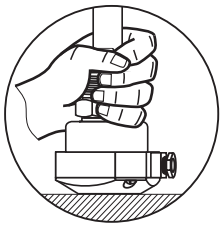
The CF420 should not be dropped or suffer any impact or fall that could damage the electronics or the thermal tip of the probe (Fig. 4 and 5).

Periodic visual inspection of the CF420 is required to check for corrosion or deposit build-up. If deposits are found, clean the sensor to ensure optimum performance.

Fig. 4

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.

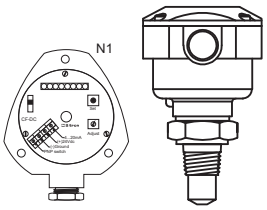
Fig. 5

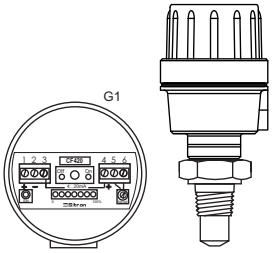


When cleaning the rod use a soft brush or any other similar object.

Technical Specifications

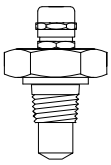
CF-420 - N1 & G1 Housing

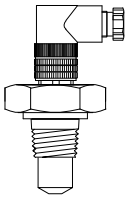


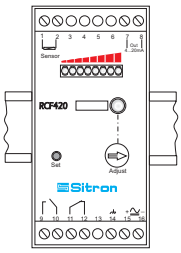


Application	Flow for liquids
Operating Voltage	DC - 24Vdc (+/- 10%)
Current Consumption	Max. 1VA
Output	N1: 4..20mA and PNP output (Max 400mA) G1: 4...20mA and Relay NO
Set Point Range	Liquid.: 0.2 to 2 m/s Oil: 0.4 to 4 m/s
Accuracy	+/- 10%
Response Time	3 to 10s
Repeatability	+/- 1% setpoint
Flow Rate Indication	8 LED's bragraph Central Red led - flow is below setpoint Central Green led - flow is above setpoint
Enclosure Material	Glass filled Nylon or Aluminum
Electrical Connection	Cable gland 1/2" NPT or M12 connector
Process Connection	½" to 1 1/2" BSP or NPT, adjustable, sanitary or flanged connections
Wetted Material	316 Stainless Steel
Operating Temperature	14 to 176º F (-10 to 80ºC) Extended neck to 248ºF (120ºC)
Max Pressure	1450 PSI (100 Bar) or 4500 PSI (300bar) upon request
Fixation	not aplicable
Class Protection	Sensor: IP 65

F420 & RCF420







Application	Flow for liquids
Operating Voltage	DC - 24Vdc (+/- 10%) AC - 85-240Vac or 125Vdc
Current Consumption	Max. 1VA
Output	4..20mA and Relay (No + NC)
Set Point Range	Liquid.: 0.2 to 2 m/s Oil: 0.4 to 4 m/s
Accuracy	+/- 10%
Response Time	3 to 10s
Repeatability	+/- 1% setpoint
Flow Rate Indication	8 LED's bragraph Central Red led - flow is below setpoint Central Green led - flow is above setpoint
Enclosure Material	Controller: ABS
Electrical Connection	Cable gland with 6,57ft (2000mm) M12 connector
Process Connection	½" to 1 1/2" BSP or NPT, adjustable, sanitary or flanged connections
Wetted Material	316 Stainless Steel
Operating Temperature	14 to 176º F (-10 to 80ºC) Extended neck to 248ºF (120ºC)
Max Pressure	1450 PSI (100 Bar) or 4500 PSI (300bar) upon request
Fixation	Controller: DIN rail 35mm or 2 Screws
Class Protection	Sensor: IP 65 Controller: IP 40

Ordering Information

MODEL

CF420	
F420	

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

INSERTION LENGTH

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

HOUSING

SC	NO ENCLOSURE
N1	SMALL NYLON
NE	N1 Encapsulated
G1	Aluminum
GE	Aluminum Encapsulated

ELECTRICAL CONNECTION

0	NONE
1	1/2" BSP (N1/G1)
2	CABLE GLAND W/ 1/2" BSP (N1)
3	CABLE GLAND W/ 1/2" BSP - 2m CABLE (N1)
4	3/4" BSP (G1)
5	CABLE GLAND W/ 3/4" BSP (G1)
6	1/2" NPT (N1/G1)
7	CABLE GLAND W/ 1/2" NPT
8	CABLE GLAND W/ 1/2" NPT- 2m CABLE (N1/G1)
9	3/4" NPT (G1)
C	CABLE GLAND W/ 3/4" NPT (G1)
J	M15.8 Connector (9 Pins) (G1)
M	M12 Connector (4 or 5 pins N1)
P	M20 threaded (N1, G1, G2)
Y	Steel Cable Gland M16 w/ 2m PVC cable (F420)

OPTIONS

MT	Medium Temp - 50mm 316SS Neck (80-120°C)

CF420	4	G	S	L50	N1	7	MT

MODEL	For Flow Switch monitor w/ Relay
CF420RM DC	Relay for F420 remote / switch supply V: 24 VDC (+/- 10%)
CF420RM AC	Relay for F420 remote / switch supply 85...240Vac

Fault	Cause	Solution
PNP switch or Relay does not change state.	LED off, no power	Check power supply
	LED doesn't change color	Check the installation (insertion length)
Output signal (4..20mA)fixed	out of calibration	Verify the calibration
	Incorrect installation (insertion length)	Check the installation (insertion length)
Flow switch turns on or off suddenly	Radio frequency interference	Use armored cable and shielded housing
PNP swith or Relay remains activated or closed	Sensor is potentialy defective	Contact Sitron or your local representative for further instruction

Terms & Conditions

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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Sitron - Brasil
R. Baronesa de Itu, 83
São Paulo - SP - 01231-001
T.: (5511) 3825-2111
F: (5511) 3825-2171

Sitron - USA
1800 Prime Place
Hauppauge, NY 11788
PH: 516-935-8001
FX: 800-516-1656

www.sitron.com
BRASIL: vendas@sitron.com
USA / Other Countries: info@sitron.com