



USER'S GUIDE

Installation, Operation, Maintenance Instructions



CF12 AC / CF12 DC

Thermal Dispersion Flow
Switch Monitor

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CF12 AC / CF12 DC Thermal Dispersion Flow Switch Monitor



The CF12 series of thermal flow switches is designed to monitor flow status of liquids and gases and can also be used to detect level.

A chain of 8 LED's gives the user a visual indication of the flow status of the switch. There are two red LEDs that indicate whether or not the unit has detected flow, a yellow LED to indicate the set point (for increasing or decreasing flows) and 5 green LEDs that indicate the amount of flow beyond the set point of the unit. The CF12 also includes a di-chromatic (red/green) LED which shows the switch point status of the unit.

The sensing element and connection of the CF12 are made with 316 S.S. and can be coated when necessary. The enclosure is offered in either glass filled nylon or aluminium.

All models can be ordered with a great variety of threaded, flange, or sanitary process connections as well as Halar[®] or epoxy coating for aggressive mediums.

For Hallar coating we recommend that the switches are made with flanged connections or a minimum of 1" threaded connection.

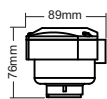
Features

- Simple to install.
- Excellent low flow sensitivity.
- Available in X-proof version.
- No moving parts-maintenance free reliability.
- Can be coated for aggressive mediums.
- Maximum working pressure of 1450 PSI (100 bar).
- Fast response time for flow or level (Adjustable from 1-10 seconds).
- Available in threaded, sanitary and adjustable insertion length connections.

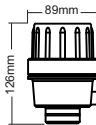
Models and Dimensions

Mounting Options for CF12

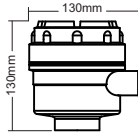
Nylon-N1



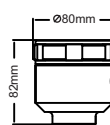
Aluminum-G1



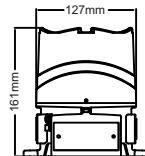
Aluminum-G2



Aluminum-G3



Aluminum-GX



Extended Necks for medium Temperature

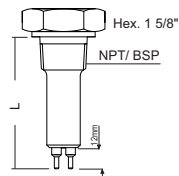
MT



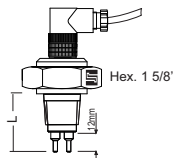
MT - Medium Temperature (up to 120°C)

Insertion Length

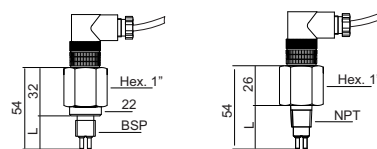
CF12AC/DC



F12



F12 Compact

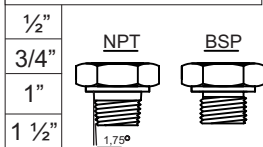


L = Insertion Length

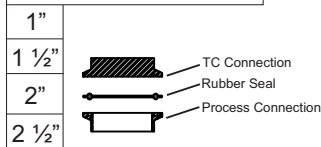
Connections	Length (L)
1/4" BSP	22mm
1/4" NPT	28mm
3/8" BSP	25mm
3/8" NPT	32mm

Process Connections

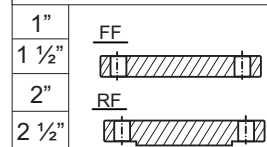
Threaded Connections



Tri-Clamp Connection

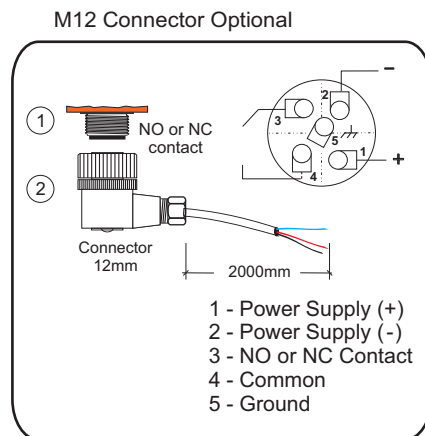
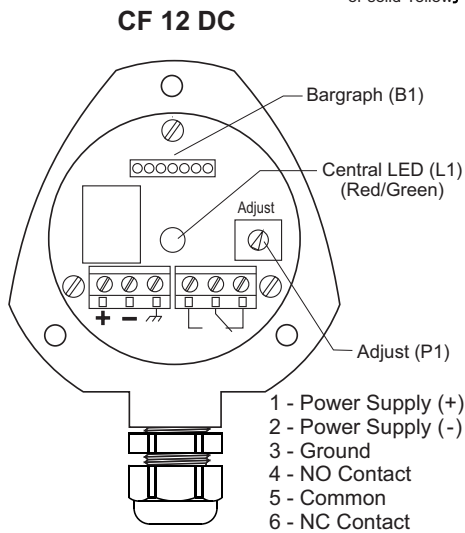
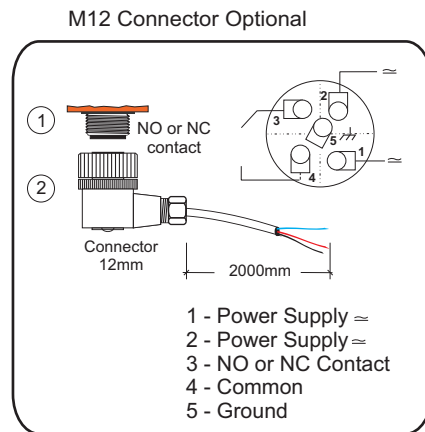
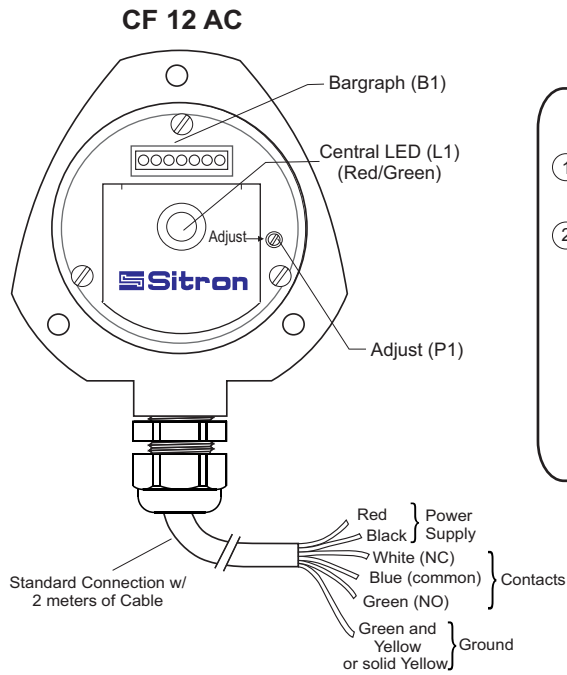


Flange Connections



Wiring Diagram

Nylon Enclosure (N1)



Wiring Diagram

Aluminium Enclosure (G1/G2)

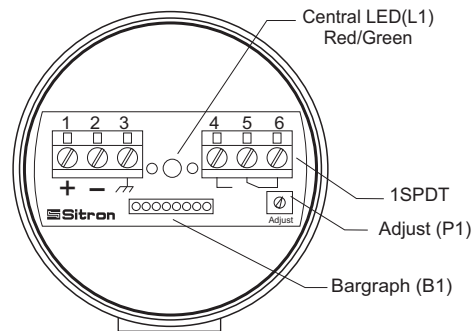
(P1) - Set Point Potentiometer Adjust

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

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

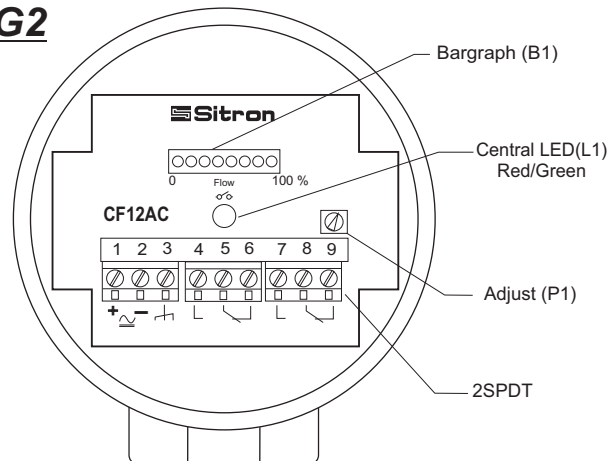
G1

- 1 - Power Supply (+)
- 2 - Power Supply (-)
- 3 - Ground
- 4 - NO Contact
- 5 - Common
- 6 - NC Contact



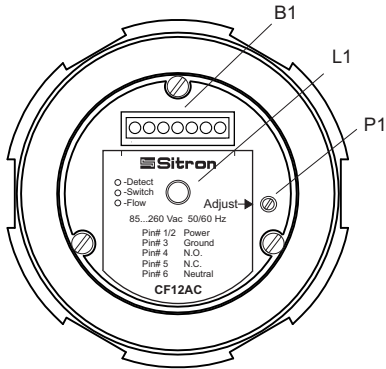
G2

- 1 - Power Supply (+)
- 2 - Power Supply (-)
- 3 - Ground
- 4 - NO Contact
- 5 - Common
- 6 - NC Contact
- 7 - NO Contact
- 8 - Common
- 9 - NC Contact



Wiring Diagram

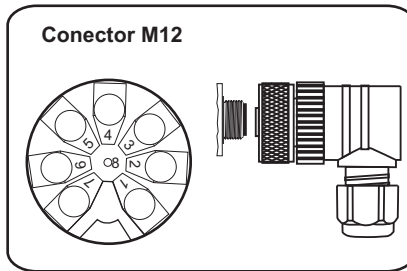
G3



(P1) - Set Point Potentiometer Adjust

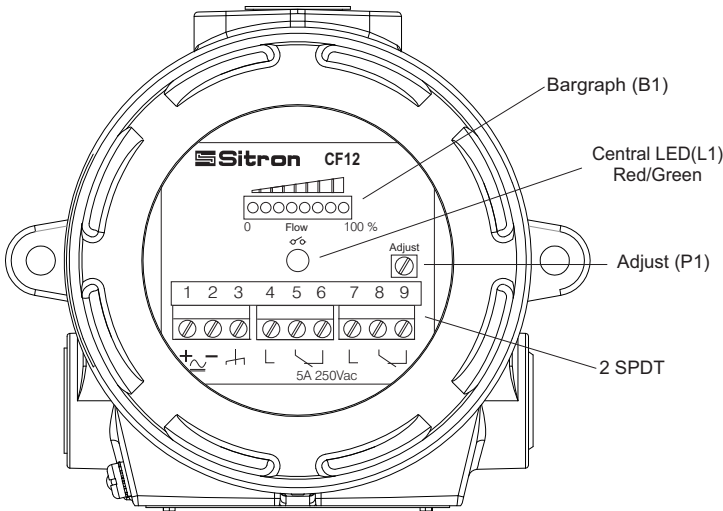
(B1) - 8 LED's Bargraph: Red LED
Yellow LED
Green LED

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



- 1 - Supply (~)
- 2 - Supply (~)
- 3 - Ground
- 4 - NO contact
- 5 - NC contact
- 6 - Common
- 7 -
- 8 -

GX

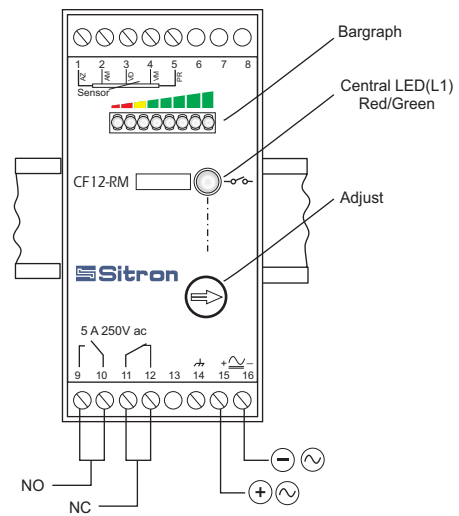
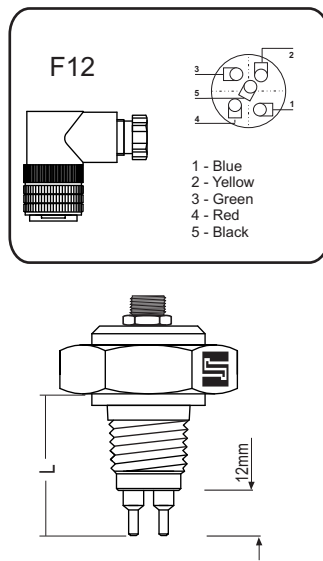


- 1 - Power Supply (+)(~)
- 2 - Power Supply (-)(~)
- 3 - Ground
- 4 - NO Contact
- 5 - Common
- 6 - NC Contact
- 7 - NO Contact
- 8 - Common
- 9 - NC Contact

Wiring Diagram

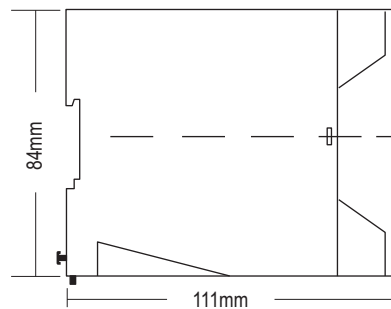
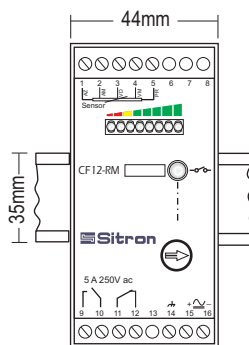
F12 with CF12RM Remote Controller

Dimensions

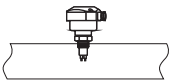
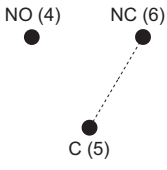
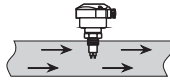
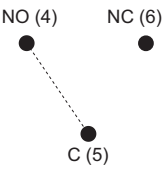


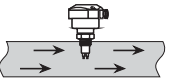
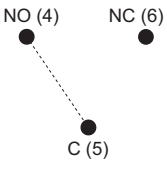

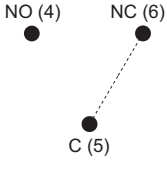
Dimensions

CF12RM



CF12 Relay Status Guide

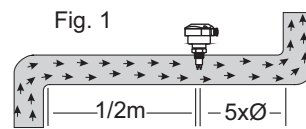
Application FSH	Condition	LED Status	Set Point	CF12 SPDT Status
	Normal	RED	OFF	
	Alarm	GREEN	ON	

Application FSL	Condition	LED Status	Set Point	CF12 SPDT Status
	Normal	GREEN	ON	
	Alarm	RED	OFF	

Pre-Installation

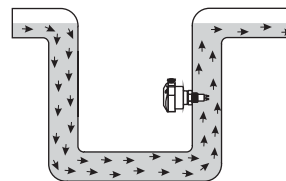
Pre-Installation Checks:

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).



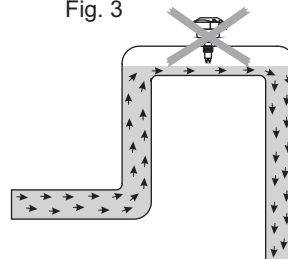
Verify that the installation point isn't near any connections, valves, elbows or anything similar, this can cause errors in the reading of the probe due to turbulence in the pipe.

Fig. 2



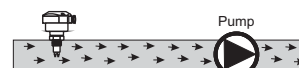
2) It is important that the flow switch is not installed at the highest point in the pipe run or in a location where there is the risk of air accumulating in the pipe. Keep in mind that the ideal mounting location is where the pipe is always full. This will ensure that the switch is always immersed in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

Fig. 4



4) Confirm that the wire connections are correct and that the available power supply is compatible with the CF12 unit.

5) Verify that the operating pressure and temperature of the process corresponds to the operating parameters of the CF12 unit.

More recommendations and handling instructions can be found on page 14.

Installation:

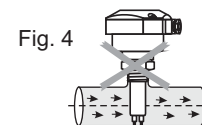
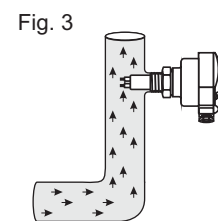
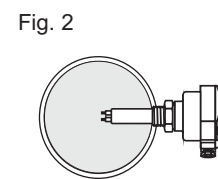
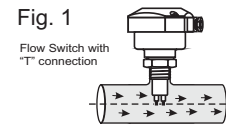
The CF12 may be installed in a pipe using a "T" connection (see fig. 1) or inserted directly into the pipe (see fig. 2). The site might need to adapt the installation so that it conforms with the following recommendations.

The CF12 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 CF12 should be installed on the side, as long as the tip of the probe sits within the middle of the pipe (See Fig. 2).

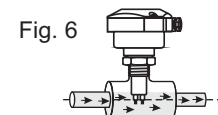
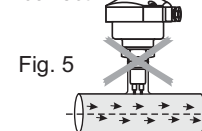
When the pipe is in a vertical position, the CF12 should be installed only when the water flow is upward (See Fig. 3).

Care should be taken when installing the CF12 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 CF12's performance may be affected.



Incorrect



Calibration

To Start:

- 1 - Remove the enclosure lid (Note: the screws are self-retaining)
- 2 - Start the power supply and wait 5 minutes until the CF12 is active and has reached a stable point within the medium.
- 3 - Let the regular or desired flow reach its point of normal operation.

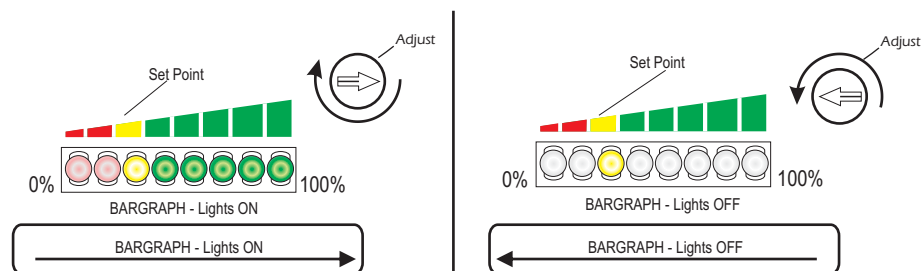
Calibration for Flow / No Flow:

- 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.



To Activate The Switch On Increasing Flow:

- 1 - Set the flow rate to the desired set point and allow it to stabilize for 2 minutes.
- 2 - Turn the potentiometer counter-clockwise until the central LED turns red.
- 3 - Turn the potentiometer clockwise until the central LED changes to a blinking green.
- 4 - Continue to turn the potentiometer clockwise until the first 2 green LEDs in the bar graph turn on.

In this mode the CF12 will activated on or above the set point. If there is a decrease of flow, the CF12 will de-activate. When the flow rate reaches the set point, the CF12 will activate.

To De-Activate The Switch On Decreasing Flow:

- 1 - Set the flow rate to the desired set point and allow it to stabilize for 2 minutes.
- 2 - Turn the potentiometer clockwise until the central LED is blinking green.
- 3 - Turn the potentiometer counter-clockwise until the central LED turns red.
- 4 - Continue to turn the potentiometer counter-clockwise until the 2 red LEDs in the bar graph are off.

In this mode the CF12 will de-activate on or below the set point. If there is an increase of flow the CF12 will activate. When the flow rate reaches the set point, the CF12 will de-activate.

Detecting level:

- 1 - Fill the tank until the probe of the CF12 is fully submerged. Turn the potentiometer counter-clockwise until the central LED turns red. With the central LED red, turn the potentiometer clockwise until the central LED changes to a blinking green.
- 2 - Continue to turn potentiometer clockwise until all green LEDs in the bar graph turn on.
- 3 - In order to be sure that the adjustment is not at a critical state give the potentiometer an additional quarter turn clockwise.

Handling

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

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

Use the correct tool during installation (Fig. 3)

The CF12 should not be dropped or suffer any impact or fall that could damage the electronics or the thermal tips of the probe (Fig. 4 and 5).

Periodic visual inspection of the CF12 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.

Ex d Enclosure Conditions for use:

Do not open the enclosure in a flammable atmosphere when there is power supplied to the unit.

2) The hazardous area approvals apply to the equipment using a sealed conduit and not cable glands. When mounting the CF12 in a hazardous area, only cable glands to EN60079-31, EN60079-1, IEC60079-1 and IEC60079-31 may be used.

3) All conduit seal fittings must be certified as flame proof "d", dust ignition protection "tb" and have a minimum IP66 rating equal to the marking on the enclosure.

4) All unused device openings must be fitted with a certified plug rated the equivalent or greater than the marking on the device.

Fig. 1

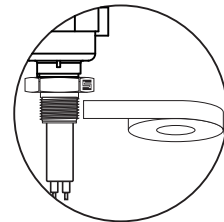


Fig. 2

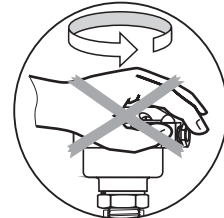


Fig. 3

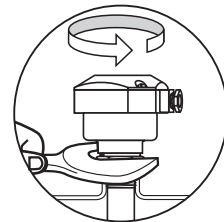


Fig. 4

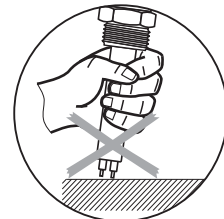
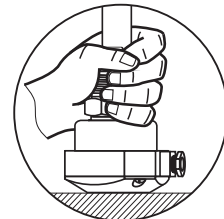
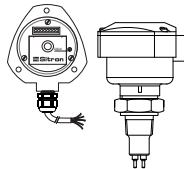


Fig. 5

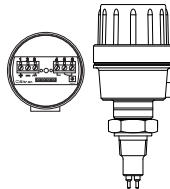


Technical Specifications

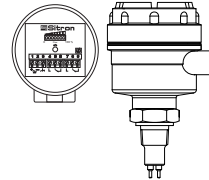
CF12AC



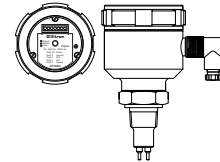
N1 Enclosure



G1 Enclosure



G2 Enclosure

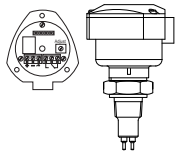


G3 Enclosure

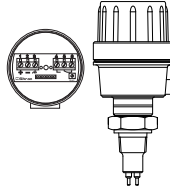
Application	Flow for liquids and gas level for liquids only
Operating Voltage	85-264Vac (50/60hz) & 125Vdc
Current Consumption	+/- 100mA
Output	Relay(SPDT) 5A - 250Vac (1 SPDT N1/G1/G3) (2 SPDT - G2 or GX) aluminum enclosure
Set Point Range	Liquid: 3 cm/s to 3 m/s - Gas: 5 cm/s to 5 m/s
Accuracy	+/- 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 (option - Aluminium)
Electrical Connection	Cable gland w/ 2000mm cable, M12 connector or ½" NPT
Process Connection	½" to 1 1/2" 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	IP65 (N1) IP66 (G1 / G2)

Technical Specifications

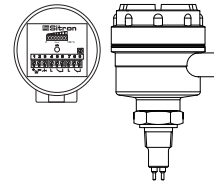
CF12DC



N1 Enclosure



G1 Enclosure



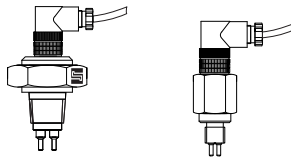
G2 Enclosure

Application	Flow for liquids and gas level for liquids only
Operating Voltage	24Vdc (+/- 10%)
Current Consumption	+/- 100mA
Output	Relay(SPDT) 5A - 250Vac (1 SPDT G1) (2 SPDT - G2 or GX) 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 (option - Aluminium)
Electrical Connection	Cable gland - 1/2" NPT conduit entry or M12 connector
Process Connection	1/2" to 1 1/2" 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	IP65 (N1) IP66 (G1 / G2)

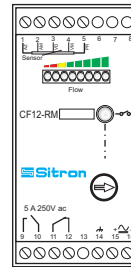
Technical Specifications

F12 + CF12RM

F12



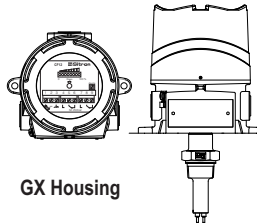
CF12 - RM



Application	Flow for liquids and gas level for liquids only
Operating Voltage	DC - 24Vdc (+/- 10%) AC - 85-264Vac & 125Vdc
Current Consumption	+/- 100mA
Output	Relay (No + NC)
Set Point Range	Liquid.: 3 cm/s to 3 m/s Gas.: 5 cm/s to 5 m/s
Accuracy	+/- 10%
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	Without Enclosure (standard) or nylon (optional) Controller: ABS
Electrical Connection	M12 Connector
Process Connection	1/4" to 1 1/2" BSP or NPT, adjustable, sanitary or flanged connections
Wetted Material	316 Stainless Steel
Operating Temperature	14 to 176° F (-10 to 80°C)
Max Pressure	1450 PSI (100 Bar)
Class Protection	Sensor: IP 65 Controller: IP 40

Technical Specifications

CF12 (Ex d) Housing



Application	Flow for liquids and gas level for liquids only
Operating Voltage	AC: 85-264Vac (50/60hz) & 125Vdc DC: 24Vdc +/- 10%
Current Consumption	+/- 100mA
Output	Relay(2 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	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	Aluminum
Electrical Connection	3/4" NPT
Process Connection	1/2" to 1 1/2" BSP or NPT, adjustable, sanitary or flanged connections
Wetted Material	316 Stainless Steel
Operating Temperature	14 to 176° F (-10 to 80°C)
Max Pressure	1450 PSI (100 Bar)
Class Protection	IP 66
Ex proof Housing Certification	ATEX, DEMKO 07 ATEX 0622294, 0539 II 2 G EX d IIC Gb / 0539 II 2 D Ex tb IIIC Db IECE / IECx UL 08.0005 / Ex d IIC Gb / Ex tb IIIC Db

Ordering Information

MODEL	
CF12AC	Relay for F12 remote / switch supply V: 85-264 VAC or 125 VDC
CF12DC	Relay for F12 remote / switch supply V: 24 VDC (+/- 10%)
F12	

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
C	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
E	EPOXY Coated

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

HOUSING	
SC	NO ENCLOSURE
N1	SMALL NYLON
NB	N1 SHIELDED
NE	N1 Encapsulated
NT	NB + NE
G1	SMALL ALUMINUM (1SPDT) 5A-250Vac
G2	LARGE ALUMINUM (2SPDT) 5A-250Vac
G3	SMALL ALUMINUM w/ ACRILIC WINDOW (1SPDT) 5A-250Vac
GX	ALUMINUM w/ GLASS WINDOW (2 SPDT) 5A-250Vac (Ex d)

ELECTRICAL CONNECTION	
0	NONE
1	1/2" BSP (N1/N2/G1/G2)
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/N2/G1/G2)
7	CABLE GLAND W/ 1/2" NPT
8	CABLE GLAND W/ 1/2" NPT- 2m CABLE (N1/N2/G1/G2)
9	3/4" NPT (G1)
C	CABLE GLAND W/ 3/4" NPT (G1)
J	M15.8 Connector (9Pins) (N2/G2/G1)
M	M12 Connector (4 or 5 pins for CF12AC) (N1)
P	M20 threaded (N1, G1, G2)
Y	Steel Cable Gland M16 w/ 2m PVC cable (F12 & F420)

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

CF12DC	4	G	S		N1	7	MT	
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MODEL	
CF12RM AC	Relay for F12 remote / switch supply V: 85-264 VAC or 125 VDC
CF12RM DC	Relay for F12 remote / switch supply V: 24 VDC (+/- 10%)

Trouble Shooting

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

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.

Terms & Conditions

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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