

FB2100/FB2200 Flow Computer Sensor Assembly Field Replacement Guide



For Part Numbers (Kits):

See tables on pages iii through v for part/kit numbers

Device Safety Considerations

▪ Reading these Instructions

Before operating the device, read these instructions carefully and understand their safety implications. In some situations, improperly using this device may result in damage or injury. Keep this manual in a convenient location for future reference. Note that these instructions may not cover all details or variations in equipment or cover every possible situation regarding installation, operation, or maintenance. Should problems arise that are not covered sufficiently in the text, immediately contact Customer Support for further information.

▪ Protecting Operating Processes

A failure of this device – for whatever reason -- may leave an operating process without appropriate protection and could result in possible damage to property or injury to persons. To protect against this, you should review the need for additional backup equipment or provide alternate means of protection (such as alarm devices, output limiting, fail-safe valves, relief valves, emergency shutoffs, emergency switches, etc.). Contact Remote Automation Solutions for additional information.

▪ Returning Equipment

If you need to return any equipment to Remote Automation Solutions, it is your responsibility to ensure that the equipment has been cleaned to safe levels, as defined and/or determined by applicable federal, state and/or local law regulations or codes. You also agree to indemnify Remote Automation Solutions and hold Remote Automation Solutions harmless from any liability or damage which Remote Automation Solutions may incur or suffer due to your failure to ensure device cleanliness.

▪ Grounding Equipment

Ground metal enclosures and exposed metal parts of electrical instruments in accordance with OSHA rules and regulations as specified in *Design Safety Standards for Electrical Systems*, 29 CFR, Part 1910, Subpart S, dated: April 16, 1981 (OSHA rulings are in agreement with the National Electrical Code). You must also ground mechanical or pneumatic instruments that include electrically operated devices such as lights, switches, relays, alarms, or chart drives.

Important: Complying with the codes and regulations of authorities having jurisdiction is essential to ensuring personnel safety. The guidelines and recommendations in this manual are intended to meet or exceed applicable codes and regulations. If differences occur between this manual and the codes and regulations of authorities having jurisdiction, those codes and regulations must take precedence.

▪ Protecting from Electrostatic Discharge (ESD)

This device contains sensitive electronic components which be damaged by exposure to an ESD voltage. Depending on the magnitude and duration of the ESD, it can result in erratic operation or complete failure of the equipment. Ensure that you correctly care for and handle ESD-sensitive components.

System Training

A well-trained workforce is critical to the success of your operation. Knowing how to correctly install, configure, program, calibrate, and trouble-shoot your Emerson equipment provides your engineers and technicians with the skills and confidence to optimize your investment. Remote Automation Solutions offers a variety of ways for your personnel to acquire essential system expertise. Our full-time professional instructors can conduct classroom training at several of our corporate offices, at your site, or even at your regional Emerson office. You can also receive the same quality training via our live, interactive Emerson Virtual Classroom and save on travel costs. For our complete schedule and further information, contact the Remote Automation Solutions Training Department at 800-338-8158 or email us at education@emerson.com.

Ethernet Connectivity

This automation device is intended to be used in an Ethernet network which **does not** have public access. The inclusion of this device in a publicly accessible Ethernet-based network is **not recommended**.

Table 1. FB2100 Sensor Assembly Part Numbers(Use Selection Column to Generate UL-listed Kit Number)

Integral Sensor		Selection
Differential Pressure Range & Accuracy	Approvals	
25 Inches H ₂ O (62.3 mbar) DP, 0.1% Accuracy Notes: <ul style="list-style-type: none"> 0.1% Accuracy not available on Traditional Flange. 25" DP option available only with static pressure options G4 or A4 and the maximum pressure is limited to 2000 psi. Available only with stainless steel sensor & coplanar flange. 	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	B221
250 Inches H ₂ O (623 mbar) DP, 0.1% Accuracy Note: 0.1% Accuracy not available on Traditional Flange.	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	B222
250 Inches H ₂ O (623 mbar) DP, 0.075% Accuracy	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	B122
1000 Inches H ₂ O (2.5 bar) DP, 0.1% Accuracy Notes: <ul style="list-style-type: none"> 0.1% Accuracy not available on Traditional Flange. 1000" DP range with 0.1% accuracy available only with Stainless steel sensor and coplanar flange. 1000" DP range not available with 300 psi static pressure. 	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	B223
1000 Inches H ₂ O (2.5 bar) DP, 0.075% Accuracy (Note 5) Note 5: 1000" DP range not available with 300 psi static pressure.	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	B123
No Differential Pressure Required, Static Pressure only, accuracy 0.1% Note: Only available with inline sensor option (2K11).	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	B2
No Differential Pressure Required, Static Pressure only, accuracy 0.075% Note: Only available with inline sensor option (2K11).	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	B1
Static Pressure Range - for use with Multivariable Sensor (B22* or B12* above)		
MV 300 psi gauge (20.7 barg) Note: 1000" DP range not available with 300 psi static pressure.	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	G6
MV 300 psi absolute (20.7 bara) Note 5: 1000" DP range not available with 300 psi static pressure.	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	A6
MV 1500 psi gauge (103.4 barg)	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	G7
MV 1500 psi absolute (103.4 bara)	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	A7
MV 3600 psi gauge (250 barg) Note: When used with 25" DP option, maximum working pressure is 2000 psi/137.9 Bar.	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	G4
MV 3600 psi absolute (250 bara) Note: When used with 25" DP option, maximum working pressure is 2000 psi/137.9 Bar.	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	A4
Static Pressure Range - for use with Static Pressure only Sensor (B1 or B2 above)		
SP 150 psi gauge (10.34 barg)	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	G2
SP 150 psi absolute (10.34 bara)	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	A2
SP 800 psi gauge (55.15 barg)	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	G3
SP 800 psi absolute (55.15 bara)	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	A3
SP 4000 psi gauge (275.79 barg)	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	G4
SP 4000 psi absolute (275.79 bara)	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	A4
Sensor Material & Flange Type		
Stainless Steel Sensor and Coplanar Flange	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	2E12
Hastelloy Diaphragm and Hastelloy Coplanar Flange Note: Not available with a 1000" 0.1% accuracy sensor or a 25" sensor.	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	3E13
Stainless Steel Sensor and Traditional Flange Note: 0.1% Accuracy not available on Traditional Flange.	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	2F12

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Integral Sensor		Selection
Stainless Steel 'In-line' connection 1/2" 14 NPT Female - use with Static Pressure only option B1 or B2 above	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	2K11
Sensor Material Certificates		
Not Required	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	Q0R
3.1 B Traceability certs to EN 10205	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	Q8R
NACE MRO 175/ISO 15156 requires Hastelloy Diaphragm Option Note: Available only with 3E13.	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	Q15R
NACE MRO 103 - requires Hastelloy Diaphragm Option Note: Available only with 3E13.	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	Q25R
Calibration Certificate		
Not Required	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	M0
Required	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	M4

Example Model Number: *B222G72E12Q0RM4*=250 Inches H₂O (623 mbar) DP, 0.1% Accuracy, MV 1500 psi gauge, Stainless Steel Sensor and Coplanar Flange, No Sensor Material Certificates Required, and Calibration Certificate Required.

Table 2 - FB2200 Sensor Assembly Part Numbers (Use Selection Column to Generate UL-listed Kit Number)

Integral Sensor		Selection
Differential Pressure Range & Accuracy	Approvals	
25 Inches H ₂ O (62.3 mbar) DP, 0.1% Accuracy Notes: <ul style="list-style-type: none"> 0.1% Accuracy not available on Traditional Flange. 25" DP option available only with static pressure options G4 or A4 and the maximum pressure is limited to 2000 psi. Available only with stainless steel sensor & coplanar flange. 	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	B221
250 Inches H ₂ O (623 mbar) DP, 0.1% Accuracy Note: 0.1% Accuracy not available on Traditional Flange.	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	B222
250 Inches H ₂ O (623 mbar) DP, 0.075% Accuracy	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	B122
1000 Inches H ₂ O (2.5 bar) DP, 0.1% Accuracy Notes: <ul style="list-style-type: none"> 0.1% Accuracy not available on Traditional Flange. 1000" DP range with 0.1% accuracy available only with Stainless steel sensor and coplanar flange. 1000" DP range not available with 300 psi static pressure. 	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	B223
1000 Inches H ₂ O (2.5 bar) DP, 0.075% Accuracy Note: 1000" DP range not available with 300 psi static pressure.	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	B123
No Differential Pressure Required, Static Pressure only, accuracy 0.1% Note: Available only with inline sensor option (2K11).	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	B2
No Differential Pressure Required, Static Pressure only, accuracy 0.075% Note: Available only with inline sensor option (2K11).	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	B1
Static Pressure Range - for use with Multivariable Sensor (B22* or B12* above)		
MV 300 psi gauge (20.7 barg) Note: 1000" DP range not available with 300 psi static pressure.	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	G6
MV 300 psi absolute (20.7 bara) Note: 1000" DP range not available with 300 psi static pressure.	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	A6
MV 1500 psi gauge (103.4 barg)	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	G7
MV 1500 psi absolute (103.4 bara)	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	A7

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Integral Sensor		Selection
MV 3600 psi gauge (250 barg) Note: When used with 25" DP option, maximum working pressure is 2000 psi/137.9 Bar.	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	G4
MV 3600 psi absolute (250 bara) Note: When used with 25" DP option, maximum working pressure is 2000 psi/137.9 Bar.	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	A4
Static Pressure Range - for use with Static Pressure only Sensor (B1 or B2 above)		
SP 150 psi gauge (10.34 barg)	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	G2
SP 150 psi absolute (10.34 bara)	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	A2
SP 800 psi gauge (55.15 barg)	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	G3
SP 800 psi absolute (55.15 bara)	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	A3
SP 4000 psi gauge (275.79 barg)	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	G4
SP 4000 psi absolute (275.79 bara)	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	A4
Sensor Material & Flange Type		
Stainless Steel Sensor and Coplanar Flange	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	2E12
Hastelloy Diaphragm and Hastelloy Coplanar Flange Note: Not available with a 1000" 0.1% accuracy sensor or a 25" sensor.	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	3E13
Stainless Steel Sensor and Traditional Flange Note: 0.1% Accuracy not available on Traditional Flange.	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	2F12
Stainless Steel inline connection 1/2" 14 NPT Female - use with Static Pressure only option B1 or B2 above	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	2K11
Sensor Material Certificates		
Not Required	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	Q0R
3.1 B Traceability certs to EN 10205	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	Q8R
NACE MRO 175/ISO 15156 requires Hastelloy Diaphragm Option Note: Available only with 3E13.	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	Q15R
NACE MRO 103 - requires Hastelloy Diaphragm Option Note: Available only with 3E13.	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	Q25R
Calibration Certificate		
Not Required	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	M0
Required	Class 1 Div 2 UL, IEC Ex N, ATEX Ex N	M4

Example Model Number: *B222G72E12Q0RM4*=250 Inches H₂O (623 mbar) DP, 0.1% Accuracy, MV 1500 psi gauge, Stainless Steel Sensor and Coplanar Flange, No Sensor Material Certificates Required, and Calibration Certificate Required.

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Removing/Replacing Sensor Assemblies

DANGER

EXPLOSION HAZARD – To replace the sensor, you must completely remove the flow computer from its installation location and move it to a non-hazardous area. Ensure the area is non-hazardous before disconnecting the flow computer.

Field Replacement Kit Part Numbers

Refer to Table 1 (for FB2100) or Table 2 (for FB2200) on pages iii through v to determine the correct field replacement kit part number.

Required Tools

- 2 mm hexagonal torque wrenches. Ranges must include 4 to 6 in-lbs (0.5 to 0.7 N-m).
- Pliers

Ambient Temperature Range

May be used up to a *maximum* ambient temperature of 80°C and a *minimum* ambient temperature of –40°C; see end product data plate for ambient temperature.

Electrical Rating

- **Input Voltage:** 10.5 Vdc to 30 Vdc external supply (Max power at 10 watts)



Important

Only use accessories supplied with the flow computer or sold by Emerson as spare parts for this flow computer. If you substitute a part you obtain elsewhere **you will void your certification unless it is the identical part from the same manufacturer** as that supplied with the flow computer from Emerson.

DANGER

EXPLOSION HAZARD: Ensure the area in which you perform this operation is non-hazardous. Performing this operation in a hazardous area could result in an explosion.

WARNING

EXPLOSION HAZARD - Do not disconnect equipment unless power has been removed or the area is known to be non-hazardous.

WARNING

EXPLOSION HAZARD –Substitution of any components may impair suitability for Class I, Division 2 locations.



Important

If this equipment is used in a manner not specified by the manufacturer, the protection provided by equipment may be impaired.

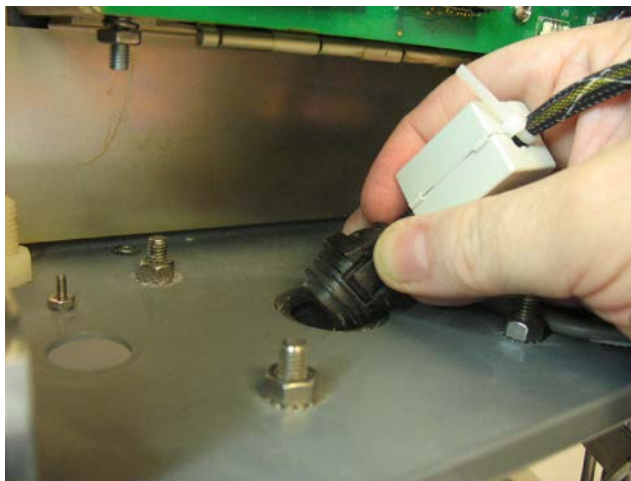
Removing/Replacing the Sensor Assembly

UL Listed Sensory Assembly Field Installed Accessory Kits for Use in Class I, Division 2, Groups A, B, C, and D. See Table 1 (for FB2100) or Table 2 (for FB2200) to determine correct UL Listed kit numbers

Note

The removal/replacement procedure is the same for all sensor assemblies listed in this document.

1. Open the enclosure.
2. Disconnect the sensor cable from the sensor assembly. For the fiberglass enclosure, you may want to use pliers if you cannot fit your fingers into the gap between the battery box and the bottom of the enclosure.



3. Use a 2 mm hex wrench to loosen the two rotation set screws on the side of the enclosure.



⚠ CAUTION

When inserting the SRAM coin cell battery push the battery gently into its slot until it stops. The battery should slide in easily. Do not use excessive force.

4. You can now place the flow computer enclosure on a flat surface with the sensor assembly protruding off the edge.

5. Rotate the sensor assembly counterclockwise until it detaches and you can pull it out from the enclosure and set it aside.
6. Slide the new (replacement) sensor assembly into the enclosure and rotate the assembly until it is tight and positioned correctly for its installation site.
7. Tighten the rotation set screws. Torque screws to 4 to 6 in-lbs (0.5 to 0.7 N-m).
8. Press the sensor cable connector into its mating connector on the sensor assembly.

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For customer service and technical support,
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