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Inventor(s)	Forwerck; Joshua

Hook and snap pressure sensor assembly

Abstract

An apparatus includes a cover assembly, a gasket, and a housing assembly. The cover assembly generally has a hook feature and a first locking feature. The hook feature generally has a first passage in communication with an exterior of the apparatus. The gasket is generally mounted on the cover assembly and has (i) a first sealing region, (ii) a second sealing region, and (iii) a second passage in communication with the first passage. The housing assembly generally has a sealing feature, a second locking feature, and a first cavity configured to hold a sensor. The sensor (a) generally seals to the second sealing region of the gasket and (b) may be in communication with the exterior of the apparatus through the first passage and the second passage. The first locking feature of the cover assembly generally cooperates with the second locking feature of the housing assembly to lock the cover assembly to the housing assembly.

Inventors: **Forwerck; Joshua (Royal Oak, MI)**

Applicant: **VEONEER US SAFETY SYSTEMS, LLC** (N/A, N/A)

Family ID: **1000008765111**

Assignee: **VEONEER US SAFETY SYSTEMS, LLC (Southfield, MI)**

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Primary Examiner: Raevis; Robert R

Attorney, Agent or Firm: DICKINSON WRIGHT PLLC

Background/Summary

FIELD OF THE INVENTION

(1) The invention relates to automotive sensor assemblies generally and, more particularly, to a method and/or apparatus for implementing a hook and snap pressure sensor assembly.

BACKGROUND

(2) Traditional pressure sensors use metallic fasteners to attach the pressure sensor to a vehicle door. The traditional pressure sensor requires two metallic fasteners that require tooling to install the fasteners. The industry is trending towards fastener-less pressure sensor designs that require no tooling for vehicle installation (i.e., an operator can install by hand). The fastener-less concept is based on the AK-LV 29 twist lock standard. The AK-LV 29 twist lock standard compliant design requires an additional locking ring part and a larger mounting pattern for attachment to the vehicle. Overall, the AK-LV 29 twist lock standard compliant design is more expensive and requires additional packaging space.

(3) It would be desirable to implement a hook and snap pressure sensor assembly to reduce cost and packaging.

SUMMARY

(4) The invention concerns an apparatus including a cover assembly, a gasket, and a housing assembly. The cover assembly generally has a hook feature and a first locking feature. The hook feature generally has a first passage in communication with an exterior of the apparatus. The gasket is generally mounted on the cover assembly and has (i) a first sealing region, (ii) a second sealing region, and (iii) a second passage in communication with the first passage. The housing assembly generally has a sealing feature, a second locking feature, and a first cavity configured to hold a sensor. The sealing feature generally mates with the first sealing region of the gasket. The sensor (a) generally seals to the second sealing region of the gasket and (b) may be in communication with the exterior of the apparatus through the first passage and the second passage. The first locking feature of the cover assembly generally cooperates with the second locking feature of the housing assembly to lock the cover assembly to the housing assembly to lock the cover assembly to the housing assembly.

Description

BRIEF DESCRIPTION OF THE FIGURES

(1) Embodiments of the invention will be apparent from the following detailed description and the appended claims and drawings.

(2) FIG. **1** is a diagram illustrating a perspective view of a pressure sensor module in accordance with an example embodiment of the invention.

(3) FIG. **2** is a diagram illustrating an exploded view of a pressure sensor module in accordance with an example embodiment of the invention.

(4) FIGS. **3**A-**3**C are diagrams illustrating sensor package alignment features and connection terminals within a housing assembly in accordance with an example embodiment of the invention.

(5) FIGS. **4**A-**4**B are diagrams illustrating a cross-sectional view showing a pressure port of a pressure sensor module in accordance with an example embodiment of the invention.

(6) FIGS. **5**A-**5**B are diagrams illustrating a cross-sectional view of the snap-on cover assembly and gasket connected to the housing assembly in accordance with an example embodiment of the invention.

(7) FIGS. **6**A-**6**C are diagrams illustrating a gasket in accordance with an example embodiment of the invention.

(8) FIGS. **7**A-**7**B are diagrams showing a cross-sectional view illustrating a pressure sensor module in accordance with another example embodiment of the invention.

(9) FIGS. **8**A-**8**D are diagrams illustrating an assembly process for attaching a pressure sensor module in accordance with an example embodiment of the invention to a panel of a vehicle.

(10) FIGS. **9**A-**9**B are diagrams showing a cross-sectional view illustrating a final position of a pressure sensor module in accordance with an example embodiment of the invention attached to a body panel of a vehicle.

DETAILED DESCRIPTION OF THE EMBODIMENTS

(11) Embodiments of the present invention include providing a hook and snap pressure sensor assembly that may (i) comprise a housing assembly, a cover assembly, a gasket, and a plastic fastener, (ii) include a hook feature to attach the hook and snap pressure sensor assembly to a panel of a vehicle, (iii) provide an integral pressure path to a pressure sensor device, (iv) be inexpensive to manufacture, (v) be attached to a panel of a vehicle without tooling, and/or (vi) be implemented using one or more plastic assembly fabrication techniques.

(12) In various embodiments, a pressure sensor assembly (or module) may be provided that may use plastic fasteners that do not need tooling. In various embodiments, a pressure sensor assembly

(module) is provided that comprises a housing assembly, a cover assembly, a gasket, and a plastic fastener. The cover assembly may have a snap-fit that does not need plastic joining technologies to join the cover assembly and the housing assembly together while the gasket provides an environmental seal to the housing assembly. The cover assembly generally provides a pressure port to a pressure sensor (device) that may be mounted in the housing assembly and a hook feature to attach the pressure sensor module to a vehicle panel.

(13) In an example, the plastic fastener may be a simple push rivet that an operator may assemble easily without tools. The housing assembly may provide a first cavity (or pocket) in which a pressure sensor device (or package) may be mounted. In an example, the pressure sensor device may be a system-in-package device. In another example, the pressure sensor device may comprise a pressure sensor device soldered to a circuit board. The housing assembly may provide a second cavity that generally provides connection terminals to form electrical connections between the pressure sensor device or printed circuit board assembly and a mating connector interface to an electrical system of the vehicle. The housing assembly also provides a mounting boss having a mounting bore (or hole) through which the plastic fastener may be inserted to lock the pressure sensor module **100** to the vehicle panel, and which may be used also with a traditional metal fastener.

(14) In various embodiments, the cover assembly generally provides a pressure path using a port feature that allows the pressure sensor device to communicate with an external environment of the pressure sensor assembly. In an example, the cover assembly may be snap-fitted to the housing assembly for an easier assembly process. In an example, the cover assembly may be over-molded on the gasket to provide a seal (e.g., an environmental seal) to the housing assembly and the pressure sensor device. In various embodiments, the pressure port geometry may be modified from tradition ports to have an undercut to allow the cover assembly to act as a hook feature that may operate to retain the pressure sensor assembly in position on a panel of the vehicle. In an example, the hook feature may provide an interference fit with an opening in the panel of the vehicle. In general, the plastic fastener acts as a final retention feature during the assembly process and is easily installed by hand. In an example, the plastic fastener (e.g., rivet) may be designed to have an interference fit to the mounting bore of the housing assembly and an opening in the panel of the vehicle. In an example, the plastic fastener may be delivered pre-assembled with the pressure sensor module (e.g., when requested by the customer).

(15) Referring to FIG. **1**, a diagram is shown illustrating a perspective view of a pressure sensor assembly (or module) **100** in accordance with an example embodiment of the invention. The pressure sensor module (or apparatus, or assembly, or unit) **100** generally implements a gas pressure sensor suitable for use in automotive applications. In an example, the pressure sensor module **100** may be used to measure an air pressure inside a vehicle. In an example, the pressure sensor module **100** may be used as a pressure side impact sensor (PSIS). In an example, the pressure sensor module **100** may be installed in a panel of a vehicle (e.g., a motor vehicle, an aircraft, a water craft, etc.). In an example, an output signal of the pressure sensor module **100** may be input to an electronic control module (ECU) of the vehicle (e.g., an airbag control unit (ACU)). In an example, deployment of a side airbag may be controlled by the ACU. In an example, the pressure sensor module **100** may mounted in doors at a side of a driver seat and a front passenger seat. At the time of a broadside collision, the pressure sensor module **100** may serve to sense a pressure change, which instantaneously occurs in the door due to deformation of the door, and transmit the sensed pressure change to the ACU.

(16) In an example, the pressure sensor assembly (or module) **100** generally comprises a housing assembly **102**, a cover assembly **104**, a gasket **106**, and a fastener **108**. A shipping (or uninstalled) state is generally illustrated. The housing assembly **102** generally comprises a mounting boss **102***a* having a mounting bore (or hole) **102***b*. The cover assembly **104** generally comprises a hook feature **104***a* having an undercut **104***b*. The hook feature **104***a* generally acts as a hook to retain the

pressure sensor assembly **100** in a mounted position on a panel of a vehicle. In various embodiments, the hook feature **104***a* is generally installed on the panel of the vehicle such that an edge of the panel is inserted in the undercut **104***b* In various embodiments, the undercut **104***b* be configured (e.g., sized or dimensioned) equal to or greater than a thickness of the panel of the vehicle onto which the pressure sensor assembly **100** is to be mounted. The housing assembly **102** is generally connected to the cover assembly **104** with the gasket **106** providing a seal between the housing assembly **102** and the cover assembly **104**.

(17) In various embodiments, the cover assembly **104** generally provides a pressure path using a port feature (or passageway) within the hook feature **104***a* and an opening in the gasket **106** that allows a sensor within the housing **102** of the pressure sensor module **100** to communicate with an external environment of the pressure sensor module **100**. In an example, the cover assembly **104** may be snap-fitted to the housing assembly **102** for an easier assembly process. In an example, the gasket **106** may be over-molded on the cover assembly **104** to provide an integrated unit for an easier assembly process.

(18) In various embodiments, a geometry of the pressure port feature of the cover assembly **104** may be modified from traditional ports to have the undercut **104***b* to form the hook feature **104***a* of the cover assembly **104**, which acts as a hook to retain the pressure sensor assembly **100** in position on the panel of the vehicle. In an example, the hook feature **104***a* may be configured to provide an interference fit with an opening in the panel of the vehicle.

(19) In an example, the fastener **108** may be implemented as a plastic fastener (or rivet) to reduce cost. In general, the fastener **108** acts as a final retention feature during an assembly process and may be easily installed without tooling (e.g., by hand). In an example, the fastener **108** may be designed to have an interference fit to the mounting bore **102***b* in the mounting boss **102***a* of the housing assembly **102** and an opening in the panel of the vehicle. In an example, the fastener **108** may be delivered pre-assembled with the pressure sensor module **100** (e.g., when requested by the customer).

(20) Referring to FIG. **2**, a diagram is shown illustrating an exploded view of the pressure sensor module **100** in accordance with an example embodiment of the invention. In an example, the housing assembly **102** may comprise a first cavity **110** and a second cavity **112**. The first cavity **110** may be configured to hold a sensor package (or unit) **114**. The second cavity **112** may be configured to receive an external electrical connector (not shown). The external electrical connector may be configured for connecting the pressure sensor module **100** to vehicle systems. The housing assembly **102** may be formed of a plastic material. In various embodiments, the plastic material may include, but is not limited to polyamide (NYLON), polybutylene terephthalate (PBT), polypropylene, polyethylene terephthalate (PET), acrylonitrile butadiene styrene (ABS), and/or various alloys and/or fillers of these resins. The housing assembly **102** may be formed using various techniques including, but not limited to casting, injection-molding, and three-dimensional printing. The housing assembly **102** may have a generally elongated shape. The mounting boss **102***a* may be formed at a first end of the housing assembly **102**. The mounting bore **102***b* is generally configured to receive the fastener **108** for mounting the sensor module **100** to a structure (e.g., panel of a vehicle, etc.).

(21) The first cavity **110** may be accessible through an opening (e.g., a sensor receiving opening) in a first (e.g., top) surface of the housing assembly **102**. The first (sensor) cavity **110** and the sensor receiving opening providing access to the inside of the first cavity **110** are generally shaped to receive and allow manipulation of the sensor package **114**. The second cavity **112** may be formed at a second (front) end of the housing assembly **102**, opposite from the first end. The second cavity **112** is generally accessible through an opening in the second end of the housing assembly **102**. In an example, the second end of the housing assembly **102** containing the second cavity **112** may be configured to implement a connector configured to form a sealed connection (e.g., similar to a USCAR connector 120-S-002-1-Z01 available from United States Council for Automotive

Research LLC).
(22) The first cavity **110** and the second cavity **112** are generally separated by a wall. A number of connection terminals (not visible) may have a first (sensor contact) end that extends through the wall into the first cavity **110** and a second (connector) end extending from the wall into the second cavity **112**. In an example, the first ends of the connection terminals may be configured to facilitate connection (e.g., via solder deposition and reflow) to terminal pins **114***a* of the sensor package **114** in the first cavity **110**. In another example, the first ends of the connection terminals may be configured to facilitate connection to contact pads of a sensor package placed in the first cavity **110**.
(23) In various embodiments, the first (sensor) cavity **110** may include features (e.g., a number of stops or ribs) **116**. The features **116** are generally configured to guide the sensor package **114** within the sensor cavity **110** and allow the sensor package **114** to be placed into position adjacent the first (sensor contact) ends of the number of connection terminals. The features **116** may be further configured to constrain the sensor package **114** once the sensor package **114** is placed into position adjacent the connection terminals. The features **116** in the first (sensor) cavity **110** may be configured to ensure that the sensor package **114** sits flat against the first ends of the connection terminals in the first (sensor) cavity **110**.
(24) In various embodiments, the housing assembly **102** may include a set of features **118***a*, **118***b*, and **120** on each side of the housing assembly **102**. The features **118***a*, **118***b*, and **120** are generally configured to guide portions of the cover assembly **104** to facilitate the snap fit connection of the cover assembly **104** to the housing assembly **102**. The feature **120** may be further configured to constrain the cover assembly **104** once the cover assembly **104** is pressed into position on the housing assembly **102**. The features **118***a*, **118***b*, and **120** may be configured to ensure that the cover assembly **104** and a sealing region (or surface) **106***a* of the gasket **106** fit tightly against a sealing feature (or surface) **122** of the housing assembly **102**.
(25) In various embodiments, the cover assembly **104** may include features **124***a*, **124***b*, **126***a*, and **126***b*. The features **124***a*, **124***b*, **126***a*, and **126***b* are generally configured to slide between the features **118***a* and **118***b* on each side of the housing assembly **102** to facilitate the snap fit connection of the cover assembly **104** to the housing assembly **102**. The features **126***a*, and **126***b* may be further configured to cooperate with the features **120** to constrain the cover assembly **104** once the cover assembly **104** is pressed into position on the housing assembly **102**. The features **118***a*, **118***b*, **120**, **124***a*, **124***b*, **126***a*, and **126***b* may be configured to ensure that the cover assembly **104** and the gasket **106** fit tightly against the sealing surface **122** of the housing assembly **102**. The features **118***a*, **118***b*, **120**, **124***a*, **124***b*, **126***a*, and **126***b* generally facilitate easy assembly of the cover assembly **104** and the gasket **106** to the housing assembly **102**.
(26) In various embodiments, the gasket **106** may be over-molded on the cover assembly **104** to provide an integrated unit for an easier assembly process. In an example, the gasket **106** may comprise a thermoplastic elastomeric (TPE) material. In an example, the gasket **106** may comprise a TPE material having a Shore durometer of 30. In various embodiments, the gasket **106** may have a first sealing region (or surface) **106***a* and a second sealing region (or surface) **106***b*. The first sealing region **106***a* may be configured to form a seal with the sealing feature **122** of the housing assembly **102**. The second sealing region **106***b* may be configured to form a seal with the sensor package **114**. In an example, the gasket **106** may comprise a number of features **128**. In an example, the features **128** may comprise posts (or towers or pins) configured to lock the gasket **106** to the cover assembly **104**.
(27) Referring to FIGS. **3**A-**3**C, diagrams are shown illustrating sensor package alignment features and connection terminals within a housing assembly in accordance with an example embodiment of the invention. In an example, the housing assembly **102** may comprise a connection terminal **130***a* and a connection terminal **130***b*. The connection terminals **130***a* an **130***b* may have a first (sensor contact) end that extends through the wall of the housing assembly **102** into the first cavity **110** and

a second (connector) end extending from the wall into the second cavity **112**. The first ends may be configured to facilitate electrical connections (e.g., via solder deposition and reflow, etc.) to terminal pins **114***a* of the sensor package **114** in the first cavity **110**. In various embodiments, the number of features **116** may be implemented to encompass a periphery of the sensor package **114**. The number of features **116** are generally configured to guide the sensor package **114** into a position where terminal pins **114***a* of the sensor package **114** are adjacent to solder points on the first ends of the connection terminals **130***a* and **130***b*.

(28) Referring to FIGS. **4**A-**4**B, diagrams are shown of a cross-sectional view illustrating a pressure port of a pressure sensor module in accordance with an example embodiment of the invention. Referring to FIG. **4**A, a section line A-A is shown indicating a view presented in FIG. **4**B. The hook feature **104***a* of cover assembly **104** generally provides a pressure port (or path) **140** from the external environment of the pressure sensor module **100** to the pressure sensor package **114** that may be mounted in the first cavity **110** of the housing assembly **102**. In various embodiments, the cover assembly **104** generally provides a pressure path **140** using a port feature that allows the pressure sensor package **114** to communicate with the external environment of the pressure sensor module **100** through a first passage **140***a* in the cover **104** and a second passage **140***b* in the gasket **106**.

(29) Referring to FIGS. **5**A-**5**B, diagrams are shown illustrating cross-sectional view of a gasket and a snap-on cover of a pressure sensor module in accordance with an example embodiment of the invention. Referring to FIG. **5**A, a section line B-B is shown indicating a view presented in FIG. **5**B. In an example, the gasket **106** is mounted on an inner surface of the cover assembly **104**. The gasket **106** generally has (i) the first sealing region (or surface) **106***a* that is configured to make contact with the sealing feature (or surface) **122** of the housing assembly **102**, (ii) the second sealing region (or surface) **106***b* that is configured to make contact with a top surface of the sensor package **114**, and (iii) the second passage **140***b* in communication with the first passage **140***a* in the cover assembly **104**.

(30) In an example, the features **120** of the housing assembly **102** generally comprise sloped portions **132** that interacts with the features **124***a*, **124***b*, **126***a*, and **126***b* of the cover assembly **104** to spread (or splay) the features **124***a* and **124***b* allowing the cover assembly **104** to be press fit onto the housing assembly **102**. As the cover assembly **104** is pressed onto the housing assembly **102**, the features **126***a* and **126***b* of the cover assembly **104** spring back toward the housing assembly **102** interlocking with the features **120** of the housing assembly and locking the cover assembly **104** onto the housing assembly **102**. The features **120**, **124***a*, **124***b*, **126***a*, and **126***b* are generally configured to ensure that compression of the gasket **106** is sufficient to provide a seal between the cover assembly **104**, the housing assembly **102**, and the sensor package **114**.

(31) Referring to FIGS. **6**A-**6**C, diagrams are shown illustrating a gasket in accordance with an example embodiment of the invention. In an example, the gasket **106** may comprise a base portion **142**, a column portion **144**, a face (or surface) **146**, the first sealing region (or surface) **106***a*, the second sealing region (or surface) **106***b*, the posts (or towers) **128**, and the passage (or aperture or vent) **140***b*. The face **146** generally abuts a surface of the cover assembly **104**. The posts **128** generally extend into the cover assembly **104** holding the face **146** of the gasket **106** against the surface of the cover assembly **104**. The column portion **144** is generally configured to extend into the first cavity **110** of the housing assembly **102** to allow the second sealing region (or surface) **106***b* of the gasket **106** to contact and form a seal with the sensor packager **114**.

(32) Referring to FIGS. **7**A-**7**B, diagrams of cross-sectional views are shown illustrating a pressure sensor module **100**′ in accordance with another example embodiment of the invention. In an example, the pressure sensor module **100**′ may be implemented similarly to the pressure sensor module **100**, except for a cover assembly **104**′ and a gasket **106**′. In an example, the cover assembly **104**′ may be implemented similarly to the cover assembly **104** except that the cover assembly **104**′ may be further configured to encompass (or enclose) a base portion **142**′ of the gasket **106**′. In an

example, the gasket **106**′ may be implemented similarly to the gasket **106** except that the gasket **106**′ may further comprise a second column portion **148** that extends into the pressure path **140** of the cover assembly **104**′.

(33) Referring to FIGS. **8**A-**8**D, diagrams are shown illustrating an assembly process for attaching a pressure sensor module in accordance with an example embodiment of the invention to a panel of a vehicle. In an example, a panel **150** of a vehicle may have an opening **152** and a hole **154** configured to facilitate mounting the pressure sensor module **100** to the panel **150**. In an example, the opening **152** may be rectangular in shape. In a first step (illustrated in FIG. **8**A), the hook feature **104***a* of the cover assembly **104** is placed through the opening **152** in the panel **150** of the vehicle. In some embodiments, the opening **152** may be configured (e.g., sized or dimensioned) to provide an interference fit with the hook feature **104***a* of the cover assembly **104**. In a next step (illustrated in FIG. **8**B), the pressure sensor module **100** may be linearly slid in a direction parallel with a long axis of the pressure sensor assembly **100** (e.g., illustrated by an arrow) to engage an edge **156** of the opening **152** within the undercut **104***b* of the cover assembly **104**, placing the hook feature **104***a* into a locked position on the panel **150** and aligning the mounting bore **102***b* in the mounting boss **102***a* of the housing assembly **102** with the hole **154**. In various embodiments, the long axis of the pressure sensor assembly **100** may be defined by the first end and the second end of the pressure sensor assembly **100**. In a next step (e.g., illustrated in FIG. **8**C), the fastener **108** is pressed through the mounting bore **102***b* of the mounting boss **102***a* of the housing assembly **102** and into the hole **154** (e.g., illustrated in FIG. **8**D). The fastener **108** generally forms an interference fit with the mounting bore **102***b* of the mounting boss **102***a* of the housing assembly **102** and the hole **154**.

(34) Referring to FIGS. **9**A-**9**B, diagrams showing a cross-sectional view illustrating a final position of a pressure sensor module in accordance with an example embodiment of the invention attached to a body panel of a vehicle are shown. Referring to FIG. **7**A, a section line C-C is shown indicating a view presented in FIG. **7**B. In an example, when the pressure sensor module **100** is slid into the final mounting position with the panel **150** in the undercut **104***b* of the cover assembly **104**, the cover assembly **104** and, therefore, the pressure sensor module **100** is generally hooked onto the panel **150**. With the cover assembly **104** hooked onto the panel **150**, the fastener **108** is inserted through the mounting bore of the housing assembly **102** and into the hole **154** in the panel **150**. With the fastener **108** inserted through the mounting bore of the housing assembly **102** and into the hole **154** in the panel **150**, the pressure sensor module **100** is generally prevented from uncoupling from the panel **150**.

(35) The structures illustrated in the diagrams of FIGS. **1** to **9**B may be designed, modeled, emulated, and/or simulated using one or more of a conventional general purpose processor, digital computer, microprocessor, microcontroller, distributed computer resources and/or similar computational machines, programmed according to the teachings of the present specification, as will be apparent to those skilled in the relevant art(s). Appropriate software, firmware, coding, routines, instructions, opcodes, microcode, and/or program modules may readily be prepared by skilled programmers based on the teachings of the present disclosure, as will also be apparent to those skilled in the relevant art(s) The software is generally embodied in a medium or several media, for example non-transitory storage media, and may be executed by one or more of the processors sequentially or in parallel.

(36) Data signals generated by the sensor units (or devices) may be transferred to one or more electronic control units. The electronic control units may utilize the sensor data in one or more transport vehicle functions including, but not limited to, engine control, transmission control, braking control, battery management, steering control, door control, human machine interface, seat control, speed control, restraint systems control, vehicle-to-vehicle communications and diagnostics. The electronic control units may include capabilities to adjust the sensor data to account for calibration issues, environmental factors and aging components.

(37) The terms “may” and “generally” when used herein in conjunction with “is(are)” and verbs are meant to communicate the intention that the description is exemplary and believed to be broad enough to encompass both the specific examples presented in the disclosure as well as alternative examples that could be derived based on the disclosure. The terms “may” and “generally” as used herein should not be construed to necessarily imply the desirability or possibility of omitting a corresponding element.
(38) The designations of various components, modules and/or circuits as “a”-“n”, when used herein, disclose either a singular component, module and/or circuit or a plurality of such components, modules and/or circuits, with the “n” designation applied to mean any particular integer number. Different components, modules and/or circuits that each have instances (or occurrences) with designations of “a”-“n” may indicate that the different components, modules and/or circuits may have a matching number of instances or a different number of instances. The instance designated “a” may represent a first of a plurality of instances and the instance “n” may refer to a last of a plurality of instances, while not implying a particular number of instances.
(39) While the invention has been particularly shown and described with reference to embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made without departing from the scope of the invention.

Claims

1. An apparatus comprising: a cover assembly having a hook and a first catch, wherein said hook defines a first passage in communication with an exterior of said apparatus; a gasket mounted on said cover assembly and having (i) a first sealing region, (ii) a second sealing region, and (iii) a second passage in communication with said first passage, said gasket including a plurality of posts configured to extend into corresponding holes in the cover assembly for holding the gasket to the cover assembly; and a housing assembly having a sealing surface, a second catch, and a first cavity configured to hold a sensor, wherein (i) said sealing surface mates with said first sealing region of said gasket, (ii) said sensor (a) seals to said second sealing region of said gasket and (b) is in communication with said exterior of said apparatus through said first passage and said second passage, and (iii) said first catch of said cover assembly cooperates with said second catch of said housing assembly to lock said cover assembly to said housing assembly.
2. The apparatus according to claim 1, wherein said first catch of said cover assembly snap fits to said second catch of said housing assembly.
3. The apparatus according to claim 1, wherein said sealing surface of said housing assembly is configured to form an environmental seal with said first sealing region of said gasket while said housing assembly is assembled to said cover assembly.
4. The apparatus according to claim 1, wherein said sensor comprises a gas pressure sensor.
5. The apparatus according to claim 1, wherein said sensor measures an air pressure inside a vehicle.
6. The apparatus according to claim 1, wherein said apparatus comprises a pressure side impact sensor of a vehicle.
7. The apparatus according to claim 1, wherein said hook feature of said cover assembly is configured to mount said apparatus to a body panel of a vehicle.
8. The apparatus according to claim 1, wherein said hook of said cover assembly is configured to be inserted into a first opening in a body panel of a vehicle and linearly slid into a locked position.
9. The apparatus according to claim 8, wherein said hook of said cover assembly is further configured to have an interference fit with said first opening in said body panel of said vehicle.
10. The apparatus according to claim 8, further comprising a plastic fastener, wherein (i) said housing assembly further comprises a mounting boss having a mounting bore and (ii) said plastic fastener is configured to pass through said mounting bore of said housing assembly and into a

second opening in said body panel of said vehicle.
11. The apparatus according to claim 10, wherein said plastic fastener is configured to have an interference fit with said mounting bore of said housing assembly and said second opening in said body panel of said vehicle.
12. The apparatus according to claim 1, wherein said housing assembly further comprises a second cavity configured to receive an external electrical connector and connect said sensor to an electrical system of a vehicle.
13. The apparatus according to claim 1, wherein said gasket is over-molded on said cover assembly.
14. An apparatus comprising: a cover assembly having a hook and a first catch, wherein said hook is configured to protrude through an opening in a panel of a vehicle and to engage an edge of the opening, and wherein the hook defines a first passage in communication with an exterior of said apparatus; a gasket mounted on said cover assembly and defining a second passage in communication with said first passage; and a housing assembly having a sealing surface, a second catch, and a first cavity configured to hold a sensor, wherein said gasket is disposed between and seals against said cover assembly and said sealing surface of said housing assembly, wherein said first catch of said cover assembly cooperates with said second catch of said housing assembly to lock said cover assembly to said housing assembly, and wherein said housing assembly further comprises a mounting boss having a mounting bore configured to receive a fastener therethrough for holding said hook in a fixed position protruding through the opening in the panel of the vehicle.
15. The apparatus according to claim 14, wherein said sensor comprises at least one of: a gas pressure sensor, a pressure sensor configured to measure an air pressure inside the vehicle, or a pressure side impact sensor.
16. The apparatus according to claim 14, wherein said gasket is over-molded on said cover assembly.
17. An apparatus comprising: a cover assembly having a hook and a first catch, wherein said hook is configured to protrude through an opening in a panel of a vehicle and to engage an edge of the opening, and wherein the hook defines a first passage in communication with an exterior of said apparatus; a housing assembly having a sealing surface, a second catch, and a first cavity configured to hold a sensor; and a gasket mounted on said cover assembly and including a base portion defining a surface and a column portion extending perpendicularly from said surface of said base portion, wherein said base portion and said column portion together define a second passage, wherein said gasket is disposed between and seals against said cover assembly and said sealing surface of said housing assembly, wherein said column portion of said gasket is configured to extend into the first cavity of the housing and to seal against the sensor, and wherein said first catch of said cover assembly cooperates with said second catch of said housing assembly to lock said cover assembly to said housing assembly.
18. The apparatus according to claim 17, wherein said sensor comprises at least one of: a gas pressure sensor, a pressure sensor configured to measure an air pressure inside the vehicle, or a pressure side impact sensor.
19. The apparatus according to claim 17, wherein said gasket includes a plurality of posts configured to extend into corresponding holes in the cover assembly for holding the gasket to the cover assembly.
20. The apparatus according to claim 17, wherein said gasket is over-molded on said cover assembly.