the connection. In fact, manual monitoring of bolt tension is labor intensive and, therefore, not routinely or regularly done.

[0004] Thus, a flange connection that actively monitors changes in compression would be welcome within the industry. Notably, while some installation bolts provide this function upon the initial compression load being applied, they lack the ability to provide updates over time. Further, the positioning of the gasket itself makes it a more ideal vehicle, to the extent that appropriate sensors can be integrated within a design that is still capable of withstanding compression and thermal stresses common to gasket installations.

[0005] Previous structures have been proposed whereby pressure sensors and other monitoring equipment can be incorporated into a radial port away from the main pipeline (e.g., United States Patent 6,606,912). Still other proposals suggested positioning sensors within a cuff-like fitting that surrounds the joint section (e.g., United States Patent 10,422,449). Neither of these proposals are ideal to the extent that they require significant additional structure, above and beyond the gasket that is usually positioned between the joint connection.

[0006] As background on gasket designs, United States Patent Publications 2018/0328491; 2017/0074437; and 2017/0276249, as well as United States Patents 10,198,200; 9,976,680; 9,285,062; 5,823,542; 5,794,946; 5,664,791; 4,127,277; and 4,059,215, are all incorporated by reference herein.

[0007] A gasket that can accommodate integrated sensors without substantially departing from its role as a sealing element would be welcome. Further, a gasket having sensors that allow for direct detection of changes to the gasket, rather than the joint/flange, would provide a more reliable and potentially useful monitoring system. Lastly, a sensor-embedded gasket that can be handled and treated no differently than a conventional gasket when joining fittings would be particularly welcome.

SUMMARY

[0008] A gasket having embedded compression sensors is contemplated. Additional functionality is provided to allow for the seamless communication between this sensor and other networked monitoring devices.

[0008a] According to an aspect of the present invention there is provided a gasket comprising: a substantially annular core having an inner circumferential face and an outer circumferential face; and a sensor element configured for engagement with said outer circumferential face; the gasket further comprising a mounting groove formed into said outer circumferential face, wherein said sensor element is disposed within said mounting groove.

[0009] Specific reference is made to the appended claims, drawings, and description, all of which disclose elements of the invention. While specific embodiments are identified, it will be understood that elements from one described aspect may be combined with those from a separately identified aspect. In the same manner, a person of ordinary skill will have the requisite understanding of common processes, components, and methods, and this description

CLAIMS

What is claimed is:

1. A gasket comprising:

a substantially annular core having an inner circumferential face and an outer circumferential face; and

a sensor element configured for engagement with said outer circumferential face;

the gasket further comprising a mounting groove formed into said outer circumferential face, wherein said sensor element is disposed within said mounting groove.

2. The gasket of claim 1 wherein said sensor element comprises at least one sensor and at least one mounting strip, wherein said at least one sensor is coupled to said at least one mounting strip.

3. The gasket of claim 2 wherein said mounting strip is composed of a conductive material.

4. The gasket of claim 3 wherein said sensor element is further configured for wireless transmission of sensor data.

5. The gasket of claim 4 further comprising an outer guide ring positioned radially outward relative to said outer circumferential face.