Based on this context, the present invention was developed.

~~Objects of the Invention~~

~~By this way, one of the objects~~ Embodiments of the present invention ~~is~~ seek to provide a status checking method of alternative compressor valve which, in a simplified form, ~~is~~ may be capable of assessing the real operational status of at least a linearly alternative performance (metal pallet-type) valve by varying a magnetic field generated by same so as to reduce the energy amount spent during actuation of said valve.

~~Another object~~ Embodiments of the present invention ~~is~~ further seek to immediately withdraw the current and voltage applied to the coil in the case where undue opening of a valve ~~is~~ may be detected in order to protect said valve from breaking.

In addition, ~~it also an object~~ embodiment of the invention seek to provide a status checking system of alternative compressor valve which, based on the components already disclosed in the alternative compressor, ~~is~~ may be capable of performing the status checking method of alternative compressor valve.

Summary of the Invention

~~These and other objects now disclosed are entirely achieved by the system and method for checking the operational status of alternative compressor valve.~~According to a first aspect of the present invention, there is provided operational status checking method of alternative compressor valve, comprising a method included in an operational status checking system of alternative compressor valve, said system comprising at least a metal valve functionally disposed in at least a compression cylinder of an alternative compressor, at least an inductive component, at least a sensor, and at least a data processing core; said metal valve comprising a valve capable of between switched between at least two operational statuses, where inductive component is fed by a signal in the form of continuous current with amplitude wherein it comprises:

at least a step of achieving a signal of electric parameter from sensor;

at least a step of measuring the voltage of inductive component from the signal of electric parameter from the sensor;

at least a step of comparing between the voltage value of inductive component and a predefined value; and

the opened operational status of the value being identified when the voltage value is lower than the predefined value.

According to a second aspect of the present invention, there is provided operational status checking method of alternative compressor valve, comprising a method included in a operational status checking system of alternative compressor valve, said system comprising at least a metal valve functionally disposed in at least a compression cylinder of an alternative compressor, at least an inductive component, at least a sensor, and at least a data processing core; said metal valve comprising a valve capable of between switched between at least two

operational statuses, where inductive component is fed by a signal in the form of continuous voltage with amplitude, a switching period and switching time, wherein it comprises:

at least a step of achieving a signal of electric parameter from sensor;

at least a step of measuring the electric current of inductive component from the signal of electric parameter from the sensor;

at least a step of comparing between the electric current value of inductive component and a predefined value; and

the opened operational status of the value being identified when the current value is superior to the predefined value; and

said predefined value is experimentally dimensioned.

~~The~~ There is disclosed a system ~~itself~~ that comprises at least one metal valve functionally disposed in at least a compressor cylinder of an alternative compressor, at least an inductive component, at least a sensor and at least a data processing core. Said metal valve in turn refers to a valve capable of being switched between two operational statuses (between an "opened" operational status and a "closed" operational status), and comprises a semi-commanded pallet-type valve.

~~In accordance with the present invention, t~~The inductive component is capable of inducing an electromagnetic field whose intensity varies in accordance with the relative proximity of the metal valve, the sensor is capable of converting the intensity variation of the electromagnetic field induced by the inductive component to at least one proportionally variable signal of at least one electrical parameter, and the data processing core is capable of estimating one among two possible operational statuses of said metal valve from the variation of at least one electric parameter provided by said sensor.

The inductive component preferably comprises a coil. With regard to the sensor, it preferably comprises an amperemeter (which may or may not be provided in a pre-existing module of data processing core). Said data processing core may comprise a microcontroller or a microprocessor.

The operational status checking method of alternative compressor valve~~, in accordance with the present invention,~~ comprises a method included in an operational status checking system of alternative compressor valve, as outlined above, and provides at least

one step of obtaining electric parameter signal from the sensor, at least one step of estimating the inductance value of the inductive component from the electric parameter signal received from the sensor and at least one step of comparing between the inductance value of the inductive component and the predefined value, which is representative of the valve operational status, which may sometimes be representative of the valve opened operational status and sometimes representative of the valve closed operational status.

~~More particularly, and also in accordance with the present invention,~~ The inductance value is estimated by the equation ($L_n \approx \frac{V \times t_c}{di}$), where the value of the valve closed operational status is identified when the estimated inductance value is higher than the predefined value k1.La, and the value of the valve opened operational status is identified when the estimated inductance value is lower than the predefined value k2.La.

~~Optionally, and still in accordance with the present invention, w~~When the inductive component is fed by a signal in the form of continuous voltage with amplitude, the valve opened operational status is identified when the current value measured in an amperemeter contained in the circuit is higher than the predefined value Imax, wherein the predefined value Imax is experimentally obtained.

~~Also optionally, and still in accordance with the present invention, when~~ When the inductive component is fed by a signal in the form of a continuous current with amplitude, the valve opened operational status is identified when the voltage value measured in a voltmeter contained in the circuit is lower than the predefined value Vmin, wherein said predefined value Vmin is experimentally obtained.

Brief Description of the Drawings

The present invention will be described in detail based on figures listed below, wherein:

Fig. 1 illustrated a schematic arrangement of the operational status checking system of alternative compressor valve in accordance with the present invention;

Fig. 2 illustrates an equivalent electric model for a valve coil to be monitored;

Fig. 3 illustrates a preferential option of the processing logics of the operation status checking method of alternative compressor valve; and

Fig. 4 illustrates an option of detecting undue opening of the valve when its coil is voltage-fed;

Fig. 5 illustrates an option of detecting undue opening of the valve when its coil is current-fed.

Detailed Description of the Invention

As known by a person skilled in the art, and in accordance with Faraday's Induction Law, it is known that a variable magnetic field in an inductive component induces a voltage in the terminals thereof.

CLAIMS

1. Operational status checking method of alternative compressor valve, comprising a method included in an operational status checking system of alternative compressor valve, said system comprising at least a metal valve (1) functionally disposed in at least a compression cylinder (2) of an alternative compressor, at least an inductive component (3), at least a sensor (4), and at least a data processing core (5); said metal valve (1) comprising a valve capable of between switched between at least two operational statuses, where inductive component (3) is fed by a signal (6) in the form of continuous current with amplitude (I), CHARACTERIZED in that wherein it comprises:

at least a step of achieving a signal of electric parameter from sensor (4);

at least a step of measuring the voltage of inductive component (3) from the signal of electric parameter from the sensor (4);

at least a step of comparing between the voltage value of inductive component (3) and a predefined value (V_{min}); and

the opened operational status of the value being identified when the voltage value (45) is lower than the predefined value (V_{min}).

2. Operational status checking method of alternative compressor valve, comprising a method included in a operational status checking system of alternative compressor valve, said system comprising at least a metal valve (1) functionally disposed in at least a compression cylinder (2) of an alternative compressor, at least an inductive component (3), at least a sensor (4), and at least a data processing core (5); said metal valve (1) comprising a valve capable of between switched between at least two operational statuses, where inductive component (3) is fed by a signal (6) in the form of continuous voltage with amplitude (V), a switching period (PC) and switching time (tc), CHARACTERIZED in that wherein wherein it comprises:

at least a step of achieving a signal of electric parameter from sensor (4);

at least a step of measuring the electric current of inductive component (3) from the signal of electric parameter from the sensor (4);

at least a step of comparing between the electric current value of inductive component (3) and a predefined value (I_{max}); and

the opened operational status of the value being identified when the current value (44) is superior to the predefined value (I_{max}); and

said predefined value (I_{max}) is experimentally dimensioned.

3. Method, in accordance with claim 1, CHARACTERIZED in that wherein said predefined value (Vmin) is experimentally obtained.