

CLAIMS

1. Data and commands communication system between variable capacity compressor and electronic thermostat (200) for a cooling system, the compressor comprising at least a frequency inverter unit (100) electrically associated to an electrical motor of the compressor, the electronic thermostat (200) being electrically associated to the frequency inverter unit (100), the electronic thermostat (200) and the frequency inverter unit (100) being powered by an alternating voltage source (15) by means of a phase cable (F) and a neutral cable (N);
- 5 the frequency inverter unit (100) comprising an electronic receptor device (2); and
- 10 the electronic thermostat (200) comprising an electronic transmitter device (1);
- the data communication system being characterized by comprising:
- 15 a data communication single highway (50) formed by a single data communication electrical cable between the electronic thermostat (200) and the inverter unit (100);
- an electrical communication circuit defined by an electrical association between the alternating voltage source (15), the communication data single highway (50), the frequency inverter unit (100) and the electronic thermostat (200);
- 20 the electronic transmitter device (1) being connected to the phase cable (F) and the electronic receptor device (2) being connected to the neutral cable (N) such that the electrical communication circuit referenced to the alternating voltage source (15) is established,
- 25 the electronic transmitter device (1) being capable of modulating a voltage value (V_f) or a current value (I_f) of the alternating voltage source (15) and the electronic receptor device (2) being capable of demodulating the voltage value (V_f) or the current value (I_f) of the alternating voltage source (15) in order to establish an exchange of data between the frequency inverter unit (100) and the electronic thermostat (200) via the data communication single highway (50).
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2. Data and commands communication system between variable capacity compressor and electronic thermostat for a cooling system, according to claim 1, characterized wherein the exchange of data between the electronic thermostat (200) and the inverter unit (100) is unidirectional.

5 3. Data and commands communication system between variable capacity compressor and electronic thermostat for a cooling system, according to claim 1, characterized wherein:

the inverter comprises additionally at least an electronic transmitter device (1);

10 the thermostat comprises additionally at least an electronic receptor device (2);

the exchange of data between the electronic thermostat (200) and the inverter unit (100) is bidirectional.

15 4. Data and commands communication system between variable capacity compressor and electronic thermostat for a cooling system, according to claim 3, characterized wherein the bidirectional exchange of data occurs:

by way of a first communication period (T1), arranged for the modulation of the voltage value (Vf) or the current value (If) of the alternating voltage source (15) configuring a modulated information signal (Sx) by the electronic thermostat (200) and for the demodulation of the modulated information signal (Sx) by the inverter unit (100), and

20 by way of a second communication period (T2) arranged for the modulation of the voltage value (Vf) or the current value (If) of the alternating voltage source (15) configuring a modulated information signal (Sx) by the inverter unit (100) and for the demodulation of the modulated information signal (Sx) by the electronic thermostat (200).

25 5. Data and commands communication system between variable capacity compressor and electronic thermostat for a cooling system, according to claims 2, characterized wherein the data communication unidirectional occurs by the modulation of the voltage value (Vf) or the current value (If) of the alternating voltage source (15) generated by the electronic thermostat (200) and by the demodulation of the voltage value (Vf) or the current value (If) of

the alternating voltage source (15) determined by the inverter unit (100).

6. Data and commands communication system between variable capacity compressor and electronic thermostat for a cooling system, according to claim 4, characterized wherein the modulated information signal (Sx) is
5 formed by counting a number of frequency cycles of the alternating voltage source (15).

7. Data and commands communication system between variable capacity compressor and electronic thermostat for a cooling system, according to claim 4, characterized wherein the modulated information signal (Sx) is
10 formed from a set of binary words formed by frequency cycles of the alternating voltage source (15).

8. Data and commands communication system between variable capacity compressor and electronic thermostat for a cooling system, according to claim 1, characterized wherein the modulated information signal (Sx) is
15 carried out using a measured frequency value, or cyclic rate, of the alternating voltage source (15).

9. Data and commands communication system between variable capacity compressor and electronic thermostat for a cooling system, according to claim 1, characterized wherein the communication data single highway
20 (50) comprises an alternating voltage power coming from the alternating voltage source (15) capable of powering the electronic thermostat (200) and the inverter unit (100).

10. Data and command communication method between variable capacity compressor and electronic thermostat for a cooling system, the compressor comprising at least a frequency inverter unit (100) electrically associated to an electrical motor of the compressor, the electronic thermostat (200) being electrically associated to the frequency inverter unit (100), the electronic thermostat (200) and the frequency inverter unit (100) being powered by an alternating voltage source (15) by means of a phase cable (F) and a neutral cable (N), the method being characterized by comprising the following
30 steps:

- inform to the frequency inverter unit (100), by means of the electronic

thermostat (200), a thermal setpoint condition of the cooling system, in a first communication instant (t10), by sending a modulated information signal (Sx) from a data communication single highway (50) formed by a single data communication electrical cable between the electronic thermostat (200) and the inverter unit (100),

inform to the electronic thermostat (200), by means of the inverter unit (100), at least a measured electrical magnitude value, in a second communication instant (t20), by sending a modulated information signal Sx using the data communication single highway (50).

11. Cooler characterized by comprising at least a data communication system between variable capacity compressor and electronic thermostat as defined in one of the claims 1 to 10.

CLAIMS

1. Data and commands communication system between a variable capacity compressor and an electronic thermostat (200) for a cooling system, the compressor comprising at least a frequency inverter unit (100) electrically associated to an electrical motor of the compressor, the electronic thermostat (200) being electrically associated to the frequency inverter unit (100), the electronic thermostat (200) and the frequency inverter unit (100) being powered by an alternating voltage source (15);

the frequency inverter unit (100) comprising an electronic receptor device (2); and

the electronic thermostat (200) comprising an electronic transmitter device (1);

the data communication system comprising:

a data communication single highway (50) formed by a single data communication electrical cable between the electronic thermostat (200) and the inverter unit (100);

an electrical communication circuit defined by an electrical association between the alternating voltage source (15), the communication data single highway (50), the frequency inverter unit (100) and the electronic thermostat (200);

the electronic transmitter device (1) being capable of modulating a voltage value (V_f) or a current value (I_f) of the alternating voltage source (15) and the electronic receptor device (2) being capable of demodulating the voltage value (V_f) or the current value (I_f) of the alternating voltage source (15) in order to establish an exchange of data between the frequency inverter unit (100) and the electronic thermostat (200) via the data communication single highway (50).

2. Data and commands communication system between a variable capacity compressor and an electronic thermostat for a cooling system, according to claim 1, wherein the exchange of data between the electronic thermostat (200) and the inverter unit (100) is unidirectional.

3. Data and commands communication system between a variable capacity compressor and an electronic thermostat for a cooling system, according to claim 1, wherein:

the inverter comprises additionally at least an electronic transmitter device (1);

the thermostat comprises additionally at least an electronic receptor device (2);

the exchange of data between the electronic thermostat (200) and the inverter unit (100) is bidirectional.

4. Data and commands communication system between a variable capacity compressor and an electronic thermostat for a cooling system, according to claim 3, wherein the bidirectional exchange of data occurs:

by way of a first communication period (T1), arranged for the modulation of the voltage value (Vf) or the current value (If) of the alternating voltage source (15) configuring a modulated information signal (Sx) by the electronic thermostat (200) and for the demodulation of the modulated information signal (Sx) by the inverter unit (100), and

by way of a second communication period (T2) arranged for the modulation of the voltage value (Vf) or the current value (If) of the alternating voltage source (15) configuring a modulated information signal (Sx) by the inverter unit (100) and for the demodulation of the modulated information signal (Sx) by the electronic thermostat (200).

5. Data and commands communication system between a variable capacity compressor and an electronic thermostat for a cooling system, according to claim 2, wherein the unidirectional data communication occurs by the modulation of the voltage value (Vf) or the current value (If) of the alternating voltage source (15) generated by the electronic thermostat (200) and by the demodulation of the voltage value (Vf) or the current value (If) of the alternating voltage source (15) determined by the inverter unit (100).

6. Data and commands communication system between a variable capacity compressor and an electronic thermostat for a cooling system, according to claim 4, wherein the modulated information signal (Sx) is formed by counting a number of frequency cycles of the alternating voltage source (15).

7. Data and commands communication system between a variable capacity compressor and an electronic thermostat for a cooling system, according to claim 4, wherein the modulated information signal (Sx) is formed from a set of binary words formed by frequency cycles of the alternating voltage source (15).

8. Data and commands communication system between a variable capacity compressor and an electronic thermostat for a cooling system, according to claim 1, wherein the modulated information signal (Sx) is carried out using a measured frequency value, or cyclic rate, of the alternating voltage source (15).

9. Data and commands communication system between a variable capacity compressor and an electronic thermostat for a cooling system, according to claim 1, wherein the communication data single highway (50) comprises an alternating voltage power coming from the alternating voltage source (15) capable of powering the electronic thermostat (200) and the inverter unit (100).

10. Data and commands communication system between a variable capacity compressor and an electronic thermostat for a cooling system, the compressor comprising at least a frequency inverter unit (100) electrically associated to an electrical motor of the compressor, the electronic thermostat (200) being electrically associated to the frequency inverter unit (100), the electronic thermostat (200) and the frequency inverter unit (100) being powered by an alternating voltage source (15), the data communication system comprising:

a data communication single highway (50) formed by a single data communication electrical cable between the electronic thermostat (200) and the inverter unit (100), arranged to establish an exchange of data between the thermostat (200) and the inverter unit (100), the single highway (50) being connected, by way of a first electrical connection point (Sx1), to the electronic thermostat (200), and by way of a second electrical connection point (Sx2), to the inverter unit (100),

an inverter unit (100) having at least an inverter communication branch (101) electrically associated to the second electrical connection point (Sx2) in a first pole inverter (110), and in a second pole inverter (111), opposite the first pole inverter (110), to a second terminal of the alternating voltage source (15),

the electronic thermostat (200) having at least a thermostat communication branch (201) electrically associated to the first electrical connection point (Sx1) in a first thermostat pole (210), and in a second thermostat pole (211), opposite the first thermostat pole (210), to a first terminal of the alternating voltage source (15),

the exchange of data between the thermostat (200) and the inverter unit (100) being provided by the modulation of an voltage value (V_f) or a current value (I_f) of the alternating voltage source (15), so as to arrange a modulated information signal (S_x), the exchange of data between the thermostat (200) and the inverter unit (100) being provided by a demodulation of the modulated information signal (S_x).

11. Data and commands communication system between a variable capacity compressor and an electronic thermostat for a cooling system, according to claim 10,

wherein the first terminal of the alternating voltage source (15) is a phase terminal (F) and the second terminal of the alternating voltage source (15) is a neutral terminal (N), or vice versa.

12. Data and commands communication system between a variable capacity compressor and an electronic thermostat for a cooling system, according to claim 10, wherein the inverter communication branch (101) comprises at least an electronic receptor device (2) and the thermostat communication branch (201) at least an electronic transmitter device (1) in unidirectional communication.

13. Data and commands communication system between a variable capacity compressor and an electronic thermostat for a cooling system, according to claim 10, wherein the inverter communication branch (101) and thermostat communication branches (201) each one comprises at least an electronic transmitter device (1) and at least an electronic receptor device (2) in bidirectional communication.

14. Data and commands communication system between a variable capacity compressor and an electronic thermostat for a cooling system, according to claim 12, wherein the modulation of the voltage value (V_f) or the current value (I_f) is performed by way of the electronic transmitter device (1) and the demodulation of the modulated information signal (S_x) is performed by way of the receptor device (2).

15. Data and commands communication system between a variable capacity compressor and an electronic thermostat for a cooling system, according to claim 13, wherein the modulation of the voltage value (V_f) or the current value (I_f) is performed by way of the electronic transmitter device (1) and the demodulation of the modulated information signal (S_x) is performed by way of the receptor device (2).

16. Data and commands communication system between a variable capacity compressor and an electronic thermostat for a cooling system, according to claim 10, wherein the electronic transmitter device (1) is a component or electronic circuit, insulated or not, capable of modulating the voltage value (V_f) or the current value (I_f), and the electronic receptor device (2) is a component, or electronic circuit, insulated or not, capable of demodulating the voltage value (V_f) or current value (I_f), for correct interpretation of the data by the respective control circuits.

17. Data and command communication method between a variable capacity compressor and an electronic thermostat for a cooling system, the compressor comprising at least a frequency inverter unit (100) electrically associated to an electrical motor of the compressor, the electronic thermostat (200) being electrically associated to the frequency inverter unit (100), the electronic thermostat (200) and the frequency inverter unit (100) being powered by an alternating voltage source (15), the method comprising:

informing to the frequency inverter unit (100), by means of the electronic thermostat (200), a thermal setpoint condition of the cooling system, in a first communication instant (t10), by sending a modulated information signal (Sx) from a data communication single highway (50) formed by a single data communication electrical cable between the electronic thermostat (200) and the inverter unit (100),

informing to the electronic thermostat (200), by means of the inverter unit (100), at least a measured electrical magnitude value, in a second communication instant (t20), by sending a modulated information signal Sx using the data communication single highway (50).

18. A cooler comprising at least a data communication system between a variable capacity compressor and an electronic thermostat as defined in claim 1.

19. A cooler comprising at least a data communication system between a variable capacity compressor and an electronic thermostat as defined in claim 10.