11 should be preferably maintained constant, the volume of oil flowing through the bypass pipe 14 is automatically regulated based on the volume of oil allowed to flow through the cooling unit 13.

Preferably, the regulating valve 15 is configured to control the path such oil is flowing through, before reaching the oil inlet 12.

Accordingly, the regulating valve 15 can be a three way valve allowing a fluid connection between the oil inlet 12 and the bypass pipe 14 and/or between the oil inlet 12 and the fluid conduit allowing oil to reach the cooling unit 13.

Consequently, the regulating valve 15 is allowing oil to flow from the oil separator 8 either through the cooling unit 13 or through the bypass pipe 14 or is simultaneously splitting the flow of oil: partially through the cooling unit 13 and partially through the bypass pipe 14.

For an accurate control of the path of the oil, the compressor or vacuum pump 1 is further provided with an outlet temperature sensor 18, positioned at the element outlet 6 for measuring the outlet temperature, T_{out}.

Preferably, but not limiting thereto, the compressor or vacuum pump 1 further comprises an inlet temperature sensor 16 and an inlet pressure sensor 17 positioned at the gas inlet 5 for measuring the inlet temperature and the inlet pressure of the gas, and outlet pressure sensor

valve (15) by applying the calculated angle to a current position of the regulating valve (15).

15. Method according to claim 14, characterised in that the fuzzy logic algorithm is determining if the speed of the fan (21) should be increased or decreased based on the determined position of the regulating valve (15), the second error (e_2) and the evolution of the error (d(error)/dt).

16. Method according to claim 14, characterised in that the fuzzy logic algorithm comprises the step of determining the actual speed with which the speed of the fan (21) should be changed by applying a second control function (CTR_fan), and determining the value of: a fuzzy value associated with an actual angle of the position of the regulating valve (15) multiplied by the result of: a fuzzy value associated with the second error (e_2) multiplied by a third coefficient (f3) to which a fuzzy value associated with the evolution of the error (d(error)/dt) multiplied by a fourth coefficient (f4) is added.

17. An oil injected compressor or vacuum pump comprising:

- a compressor or vacuum element (4) having a gas inlet (5) , an element outlet (6) and an oil inlet (12);

- an oil separator (8) having a separator inlet (9) fluidly connected to the element outlet (6), a separator outlet (10) and an oil outlet (11) fluidly connected to the oil inlet (12) of the compressor or vacuum element (4) by means of an oil conduit;

- a cooling unit (13) connected to the oil outlet (11) of the oil separator (8) and the oil inlet (12) of the compressor or vacuum element (4);

- a bypass pipe (14) fluidly connected to the oil outlet (11) and to said oil inlet (12) for bypassing the cooling unit (13);

- a regulating valve (15) provided on the oil outlet (11) configured to allow oil to flow from the oil separator (8) through the cooling unit (13) and/or through the bypass pipe (14);

- an outlet temperature sensor (18) positioned at the element outlet (6);

- a controller unit (20) configured to control the position of said regulating valve (15);

characterised in that the cooling unit (13) is provided with a fan (21) and in that the controller unit (20) is further provided with a fuzzy logic algorithm for controlling the speed of the fan (21) based on the position of the regulating valve (15) and measured outlet temperature, for maintaining the

outlet temperature (T_{out}) at approximately a predetermined target value (T_{target}).

18. Oil injected compressor or vacuum pump according to claim 17, further comprising an inlet temperature sensor (16) and an inlet pressure sensor (17) positioned at the gas inlet (5) and further comprising an outlet pressure sensor (19) positioned at the element outlet (6).

19. Oil injected compressor or vacuum pump according to claim 18, characterised in that said controller unit (20) comprises a data link (22) for receiving measurements from each of said: inlet temperature sensor (16), inlet pressure sensor (17), outlet temperature sensor (18) and outlet pressure sensor (19), said controller unit (20) being further provided with an algorithm for calculating the predetermined target value (T_{target}) by considering a calculated atmospheric dew point (ADP) based on the received measurements.

20. Oil injected compressor or vacuum pump according to any of the claims 17 to 19, characterised in that the compressor or vacuum pump (1) comprises a relative humidity sensor (23) and in that the controller unit (20) further comprises a data link (22) for receiving measurements from the relative humidity sensor (23) positioned at the gas inlet (5) or comprises means to approximate the relative

humidity (RH) of the gas at the level of the gas inlet (5).

21. Oil injected compressor or vacuum pump according to any of the claims 17 to 20, characterised in that the controller unit (20) comprises means for controlling the speed of the fan (21) based on the position of the regulating valve (15) and an error, calculated by subtracting the predetermined target value (T_{target}) from the measured outlet temperature (T_{out}).

22. Oil injected compressor or vacuum pump according to any of the claims 17 to 21, characterised in that the fan (21) is provided with a variable speed motor (24).

23. Oil injected compressor or vacuum pump according to any of the claims 17 to 22, characterised in that the compressor or vacuum pump (1) further comprises an energy recovering unit (25) connected to the oil outlet (11) and the oil inlet (12).

24. A controller unit for controlling an outlet temperature (T_{out}) of an oil injected compressor or vacuum pump (1) comprising a compressor or vacuum element (4) provided with a gas inlet (5), an element outlet (6), and an oil inlet (12) said controller unit (20) comprising:

- a measuring unit comprising a data input configured to receive outlet temperature data at the element outlet (6);

- a communication unit comprising a first data link (32) for controlling the position of an oil regulating valve (15) in order to regulate the flow of oil through a cooling unit (13) connected to said oil inlet (12);

characterised in that

- the communication unit further comprises a second data link (33) for controlling the rotational speed of a fan (21) cooling the oil flowing through said cooling unit (13); and wherein

- the controller unit (20) further comprises a processing unit provided with a fuzzy logic algorithm determining the speed of the fan (21) based on the position of the regulating valve (15) and the measured outlet temperature (T_{out}).

25. Controller unit according to claim 24, characterised in that the measuring unit further comprises a data input configured to receive: inlet temperature data, inlet pressure data and outlet pressure data.

26. Controller unit according to claim 25, characterised in that said processing unit is provided with an algorithm for calculating a predetermined target value (T_{target}) by considering a calculated atmospheric dew point (ADP) based on the measurements received from the measuring unit.