

Waste Compactor and Driving System Therefor

Field

5 The present application generally relates to a driving system for a waste compactor, especially for a mobile waste compactor, comprising a hydraulic circuit and an electronic control module for controlling the hydraulic circuit. The present application also generally relates to a waste compactor, especially a mobile waster compactor,
10 having said driving system.

Background

15 In the field of waste disposal, a waste compactor is usually used to compress collected wastes to reduce their volume, such that they can be readily transported, stored and post-treated. The waste compactor usually comprises a body, a pusher head movably installed in the body, and a lift mechanism for feeding the wastes into the body. After the wastes are fed into the body by the lift mechanism, the pusher head is operated to compress the wastes. The waste compactor is controlled by a control system having a
20 hydraulic system and an electronic control part. The pusher head and the lift mechanism are actuated by a hydraulic cylinder of the hydraulic system.

Usually, the hydraulic cylinder is controlled by energizing or de-energizing relevant solenoid valves of the hydraulic system. Action control of the hydraulic system is
25 relatively complex. For example, when it is required to control the pusher head to operate at a quicker or slower speed or when the pusher head's operation time is over, the solenoid valve need be switched under a high pressure, which leads to a relatively strong noise. Further, because a throttle valve is used to release the high pressure and fluids when the pusher head is stopped, hydraulic oil in the hydraulic system is prone to
30 giving out heat to decrease its reliability. Moreover, in order to control relevant actions of the hydraulic system, more hydraulic components should be used in the hydraulic system, which may result in more fault points.

Furthermore, in a conventional hydraulic system, as soon as the resistance of the pusher
35 head caused by the compressed wastes reaches its maximum value or the pusher head

arrives at its stroke's end, the hydraulic system's pressure will approach or reach its maximum value. The pressure of the hydraulic system is measured by a pressure sensor provided in the hydraulic system. Signals obtained by the pressure sensor are transmitted to the electric control part which then switches the solenoid valve's position
5 based on the signals. It may be a relatively long term from a time when the pressure is determined to arrive at its maximum value to a time when the solenoid valve is operated correspondingly, which may cause relevant mechanical components, the hydraulic system and the electric control part to be overloaded and thus damaged. If the pressure sensor, the electric control part and the solenoid valve are faulty, the entire waste
10 compactor or the hydraulic system will be always in a maximum pressure state and thus the relevant mechanical components, the hydraulic system and the electric control part will be in an overloaded state for a long time. If this happens, the entire waste compactor's service life will be shortened.

15 Further, because there is high pressure oil existing in the hydraulic system when it is being operated, an electric motor of the hydraulic system is started up under load with an excessive starting current in case that the motor is re-started up after its shutdown. The service life of the electric motor is affected, the external power grid's stability is affected, and the electric motor will be started up with a loud noise.

20 Further, for the mobile waste compactor, clients sometimes may move it to different locations where it is used. However, in some countries or regions, power source specifications are different than each other, for example 380 V three-phase or 220 V two-phase. A conventional mobile waste compactor cannot be self-adapted to the
25 different power source specifications. In this case, when the compactor is used, the clients have to take into consideration of the power source specifications, which thus causes inconvenience.

Further, since a relevant sensor, for example the pressure sensor, has to be installed in
30 the body of the compactor, an installation point, where the sensor is installed, itself is a potential oil leakage point. If an oil leakage occurs, the compactor will not be normally operated. Moreover, such an installation point should be checked periodically, which leads to high post- maintenance costs.

35 **Summary of the invention**

In order to overcome the above-mentioned short-comings in the prior art, the present application is aimed at proposing a novel driving system which can be used in a waste compactor, especially a mobile waste compactor, such that the driving system can acquire operating parameters of a hydraulic cylinder and adjust operation of a relevant component based on the acquired operating parameters without a pressure sensor or other measuring components being provided in a hydraulic circuit. In the meanwhile, the number of relevant components in the hydraulic circuit can be reduced such that the entire compactor can be operated with higher reliability and a lower noise.

According to one aspect of the present application, a driving system for a waste compactor, especially a mobile waste compactor, is provided, which comprises:

a hydraulic circuit, the hydraulic circuit being connected to a hydraulic cylinder assembly of a pusher head mechanism and a hydraulic cylinder assembly of a lift mechanism of the waste compactor so as to selectively drive one of the hydraulic cylinder assemblies, the hydraulic circuit including a hydraulic pump and an electric motor for driving the hydraulic pump, and the electric motor's load current being alterable depending on the driven hydraulic cylinder assembly's operating status; and

an electric control module for controlling the hydraulic circuit, wherein the hydraulic circuit includes a variable frequency controller connected to the electric motor to monitor the electric motor's load current and carry out speed regulation of the electric motor in a variable frequency manner, and the electric control module controls the action of the hydraulic cylinder assembly via the hydraulic circuit based on the load current of the electric motor.

Optionally, the hydraulic circuit comprises an electromagnetic reverse valve and a hydraulic oil tank for storing hydraulic oil, the electromagnetic reverse valve is connected to the hydraulic cylinder assembly of the pusher head mechanism and the hydraulic cylinder assembly of the lift mechanism, and the electromagnetic reverse valve is controlled by the electric control module to be selectively in communication with an oil path between one of the hydraulic cylinder assemblies and the hydraulic oil tank.

Optionally, each hydraulic cylinder assembly comprises a hydraulic cylinder and a piston which is movable in a reciprocating manner in the hydraulic cylinder, and the

piston of the driven hydraulic cylinder assembly can be moved in a direction depending on the electric motor's output rotating direction.

Optionally, the piston of the driven hydraulic cylinder assembly can be moved at a speed depending on the electric motor's output power.

Optionally, based on the monitored load current, the electric control module can calculate the operating status of the driven hydraulic cylinder assembly, for example a position of the piston in the hydraulic cylinder.

Optionally, based on the monitored load current, the electric control module can control the pressure and/or flow of the hydraulic oil output by the hydraulic pump to control the action speed of the hydraulic cylinder assembly.

Optionally, the hydraulic circuit further comprises a check valve and/or an overflow valve arranged in an oil path between the electromagnetic reverse valve and the hydraulic oil tank.

Optionally, the electric control module comprises a touchscreen-type control panel on which a parameter of the driving system can be shown and set.

Optionally, the electric control module determines the amount of wastes in the waste compactor based on the load current of the electric motor.

According to another aspect of the present application, a waste compactor, especially a mobile waste compactor, is provided, which comprises a pusher head mechanism, a lift mechanism, and said driving system for driving and controlling the two mechanisms.

Brief description of the drawings

The preceding and other aspects of the present application can be well understood by the following detailed description with respect to the drawings. It should be understood that those drawings are made in difference scales for illustrative purposes, which, however, will not affect understanding of the present application. In the drawings:

Fig. 1 is a simplified perspective view schematically illustrating a mobile waste compactor, in which a hydraulic cylinder assembly for a pusher head mechanism is represented;

5 Fig. 2 is a simplified perspective view schematically illustrating the mobile waste compactor, in which a hydraulic cylinder assembly for a lift mechanism is represented;

Fig. 3 schematically illustrates a diagram of a hydraulic circuit according to one embodiment of the present application which can be used in a driving system of the
10 mobile waste compactor; and

Fig. 4 schematically illustrates a circuit diagram of an electric control module according to one embodiment of the present application which can be used in the driving system of the mobile waste compactor.

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Detailed description of preferred embodiments

In the attached drawings of the present application, features, whose configurations are the same or similar to each other, are represented by the same reference numerals.

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A waste compactor according to the present application will be described with regard to a concrete embodiment. It should be understood that those described contents can be applied to a mobile waste compactor.

25 As shown in Figs. 1 and 2, the waste compactor comprises a housing. Installed in the housing are a lift mechanism 2000 for handling wastes and a pusher head mechanism 1000 for compressing the wastes. The lift mechanism 200 and the pusher head mechanism 1000 can be actuated via their own hydraulic cylinder assemblies respectively. Each hydraulic cylinder assembly comprises a hydraulic cylinder and a
30 piston which is movable in a reciprocating manner in the hydraulic cylinder. The piston of the pusher head assembly 1000 is operatively connected to a pusher head of the assembly to drive the pusher head to compress the wastes. The hydraulic cylinder is provided with two hydraulic oil ports. By injecting high pressure oil into the different hydraulic oil ports in a proper order, the piston can be reciprocated in the hydraulic
35 cylinder.

The waste compactor further comprises a driving system. The driving system comprises a hydraulic circuit, whose diagram is shown in Fig. 3, and an electric control module as shown in Fig. 4.

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Fig. 3 only illustrates a concrete embodiment of the hydraulic circuit according to the present application. The hydraulic circuit comprises an electromagnetic reverse valve YV1, a valve assembly 200, two check valves C1 and C2, a hydraulic pump BP, and an electric motor M1. In the illustrated embodiment, the electromagnetic reverse valve YV1 is a two-position six-way valve. Four ports A1, A2, B1, and B2 of the valve are connected to two hydraulic oil ports of the hydraulic cylinder 1 of the pusher head assembly 1000 and two hydraulic oil ports of the hydraulic cylinder 2 of the lift mechanism 2000 via hydraulic pipelines respectively.

15 As shown, the valve assembly 200 comprises two overflow valves F1, F2 and two check valves C3, C4. The hydraulic pump BP can be a two-way metering hydraulic pump. The electric motor M1 is used to drive the hydraulic pump BP to work. The hydraulic pump BP can supply the hydraulic oil, whose pressure is varied depending on the output power of the electric motor M1, to the hydraulic circuit. The valve assembly 200 is connected to the remnant two ports A, B of the electromagnetic reverse valve YV1 via hydraulic pipelines respectively.

The hydraulic circuit further comprises an oil tank 100, in which the hydraulic oil enabling the hydraulic cylinder assembly to be operated is stored. Hydraulic pipelines extending from the oil tank 100 are connected to ports P1, P2 of the valve assembly 200 via the two check valves C1, C2 respectively. Besides, the two check valves C1 and C2 are in fluid communication with the hydraulic pump BP.

Now, how to operate the hydraulic circuit according to the embodiment of the present application will be explained below.

When the electric motor M1 is in a positive rotating state, the hydraulic oil in the oil tank 100 is sucked into the hydraulic pump BP via the check valve C2. Then, the hydraulic oil enters the port P1 of the valve assembly 200 through the check valve C1. If the electromagnetic reverse valve YV1 is de-energized now, as shown in Fig. 3, the

port A of the electromagnetic reverse valve YV1 is in communication with the port A1 and the port B of the electromagnetic reverse valve YV1 is in communication with the port B1 such that the hydraulic oil flows into the electromagnetic reverse valve YV1 through its port A and flows from the port A1 into a lower chamber of the hydraulic cylinder 1 of the pusher head mechanism, so as to drive the piston therein to move upwards. The hydraulic oil in an upper chamber of the hydraulic cylinder 1 of the pusher head mechanism flows back to the electromagnetic reverse valve YV1 through its port B1 and then flows from the port B to the oil tank 100 through the overflow valve F2. If the electromagnetic reverse valve YV1 is energized now, the ports A and B of the electromagnetic reverse valve YV1 are in communication with the ports A2 and B2 respectively such that the hydraulic oil flows into the electromagnetic reverse valve YV1 through its port A and flows from the port A2 to an upper chamber of the hydraulic cylinder 2 of the lift mechanism, so as to drive the piston therein to move downwards. The hydraulic oil in a lower chamber of the hydraulic cylinder 2 of the lift mechanism flows back to the electromagnetic reverse valve YV1 through its port B2 and flows from the port B back to the oil tank 100 through the check valve F2.

When the electric motor M1 is in a negative rotating state, the hydraulic oil in the oil tank 100 is sucked into the hydraulic pump BP via the check valve C1 such that it enters the port P2 of the valve assembly 200 through the check valve C2. If the electromagnetic reverse valve YV1 is de-energized now, as shown in Fig. 3, the ports A and B of the electromagnetic reverse valve YV1 are in communication with the ports A1 and B1 respectively such that the hydraulic oil flows into the electromagnetic reverse valve YV1 through its port B and flows from the port B1 into the upper chamber of the hydraulic cylinder 1 of the pusher head mechanism, so as to drive the piston therein to move downwards. The hydraulic oil in the lower chamber of the hydraulic cylinder 1 of the pusher head mechanism enters the electromagnetic reverse valve YV1 through its port A1 and flows from the port A back to the oil tank 100 through the check valve F1. If the electromagnetic reverse valve YV1 is energized now, the ports A and B of the electromagnetic reverse valve YV1 are in communication with the ports A2 and B2 respectively such that the hydraulic oil flows into the electromagnetic reverse valve YV1 through its ports B and flows from the port B2 to the lower chamber of the hydraulic cylinder 2 of the lift mechanism, so as to drive the piston therein to move upwards. The hydraulic oil in the upper chamber of the hydraulic cylinder 2 of the lift mechanism enters the electromagnetic reverse valve YV1 through its port A2 and flows

from the port A back to the oil tank 100 through the overflow valve F1.

It can be seen that in the inventive technical solution, the piston in the hydraulic cylinder can be moved in a direction in association with the rotating state of the electric motor M1. It is appreciated by a person skilled in the art that the direction, in which the piston can be moved, and the rotating state of the electric motor M1 can be designed in a manner opposite to what has been described above.

In the illustrated embodiment, when the electromagnetic reverse valve YV1 is de-energized, the ports A and A1 of the electromagnetic reverse valve YV1 are in communication with each other and the ports B and B1 of the electromagnetic reverse valve YV1 are in communication with each other; and when the electromagnetic reverse valve YV1 is energized, the ports A and A2 of the electromagnetic reverse valve are in communication with each other and the ports B and B2 are in communication with each other. In an alternative embodiment, the electromagnetic reverse valve YV1 can be operated in a reversed manner, for example, such that when the electromagnetic reverse valve YV1 is de-energized, the ports A and A2 of the electromagnetic reverse valve are in communication with each other and the ports B and B2 are in communication with each other; and when the electromagnetic reverse valve YV1 is energized, the ports A and A1 of the electromagnetic reverse valve YV1 are in communication with each other.

Fig. 4 only illustrates a concrete embodiment of the electric control module according to the present application. The electric control module mainly comprises a variable frequency controller 20, a power module P1, a PLC controller 40, and a control panel 30. An input end of the variable frequency controller is connected to an alternating power grid to supply electric power for the variable frequency controller. The variable frequency controller 20 is self-adapted to an input power source, that is to say, it is self-adapted to 380 V three-phase or 220 V two-phase. For instance, the variable frequency controller 20 includes a frequency-converter and a relevant control circuit. The variable frequency controller 20 is connected to the electric motor M1 at an output end, and can real-timely monitor the load current of the electric motor M1 and control the output power of the electric motor M1, especially the rotating speed of an output shaft of the electric motor M1, so as to control operation of the hydraulic pump BP. The variable frequency controller 20 is connected to the PLC controller 40 by a bus to carry out data communication therebetween. M2 is a fan of the variable frequency controller

20, which is used to cool down the variable frequency controller 20.

The power module P1 outputs a direct voltage of 24 V so as to supply electric power for the control panel 20, the PLC controller 20, and loads 50 and 60. In Fig. 4, the load 50 can be regarded as the electromagnetic reverse valve as shown in Fig. 3, and the load 60 can be regarded as a signal indicator of the control panel 30. In order to facilitate a user's operation, the control panel 30 can be a touchscreen-type control panel, which is connected to the PLC controller 40 in a data link manner to send various control commands to the latter. For instance, the control panel 30 can be designed with an interactive interface which can be conveniently and intuitively operated by the user or shows operating parameters thereon.

Now, by referring to Figs. 3 and 4, how to operate the driving system of the present application will be explained below.

First, it should be noted that the pusher head of the pusher head mechanism can be actuated in a manner including a forward action and a backward action, wherein the forward action includes differential and normal movements. The lift mechanism can be actuated in a manner including an ascending action and a descending action. The action of the pusher head is independent from that of the lift mechanism.

When the waste compactor begins to compress the wastes, the driving system is first activated, and the PLC controller 40 controls the power module P1 to output a high-frequency signal such that the electric motor M1 is in the negative rotating state to keep the electromagnetic reverse valve YV1 is kept de-energized to retreat the pusher head to an initial position.

When the variable frequency controller 20 detects that the load current of the electric motor M1 has raised a given multiple, for example of 1.5, of its rated current, it is determined that the pusher head has been retreated to its travel end. The PLC controller 40 controls the power module P1 to output a low-frequency signal such that the electric motor M1 is in the positive rotating state. Now, the electromagnetic reverse valve YV1 is still kept de-energized such that the pusher head can be advanced at a normal speed. After a period, for example of 1 second, the PLC controller 40 controls the power module P1 to output the high-frequency signal such that the pusher head is advanced in

the differential action, i.e. it can be accelerated.

During advance of the pusher head, the load current of the electric motor M1 will arise as soon as it encounters to a load (i.e. contacts the wastes). When the variable frequency
5 controller 20 detects that the load current has arrived at a given multiple, for example of 1.5, of the rated current, the PLC controller 40 controls the power module P1 to output the low-frequency signal such that the pusher head is altered to advance at the normal speed (i.e. in the normal action) and thus the wastes are further compressed.

10 When the variable frequency controller 20 detects that the load current of the electric motor M1 has raised at a given multiple, for example of 2, of the rated current, the pusher head is determined to arrive at its travel's most forward end at which the wastes cannot be compressed further. Now, the PLC controller 40 controls the power module P1 to stop its output such that the electric motor is stopped. Then, after a period, for
15 example of 1 second, the PLC controller 40 controls the power module P1 to output the high-frequency signal such that the electric motor M1 is reversely operated and the pusher head is retreated quickly. When the pusher head is retreated to the initial position, the PLC controller 40 controls the power module P1 to stop its output such that the electric motor M1 is stopped and the operation cycle of the pusher head is ended.

20 Although how to operate the pusher head acts has been explained above, it is appreciated by the skilled person in the art that the lift mechanism can acts in a similar operating way.

25 When it is desired to add wastes as pusher head is being operated, the PLC controller 40 first controls the electromagnetic reverse valve YV1 to be energized,. Now, the pusher head is stopped. The electric motor M1 is controlled to be in the positive operating state such that the lift mechanism 2000 ascends. The electric motor M1 is controlled to be in the negative rotating state such that the lift mechanism 2000 descends and thus the
30 wastes are toggled over.

Depending on different lift mechanisms, the output frequency of the power module P1 is variable, which ensures that the waste compactor can be steadily operated. After the wastes are toggled over, the pusher head is controlled to be retreated to the initial
35 position where it starts to compress the wastes. After the operation of the pusher head is

carried out circularly n times or after a predetermined time threshold is arrived at, the waste compactor is controlled to stop its action and thus its operation is stopped.

In operation, the electromagnetic reverse valve YV1 is shutdown and the output of the power module P1 is stopped in case of emergency. In operation, when the electric motor M1 is overloaded or the waste compactor is abnormally operated, the waste compactor is stopped, the electromagnetic reverse valve YV1 is shutdown, and the output of the power module P1 is stopped such that the operation of the waste compactor is stopped. If the electric motor M1 is overloaded, the operation is stopped. After 1 second, such overloading protection is automatically reset such that the waste compactor can be normally actuated again. After the waste compactor begins to be loaded again, the power module P1 outputs the low-frequency signal by which the pusher head is converted from its quick (differential) action into its normal action. If it is detected that the load current arises at 2.2 to 2.6 times of the rated current in a short period (less than a cycle time value), it is determined that the waste compactor is full. A fully loaded indicator, for example the indicator 60 is lighted up, the operation is stopped, and a normally-closed contact of a startup button for the compactor is open such that the entire compactor cannot be started up or a normally-closed contact of a startup button for the lift mechanism is open such that it cannot be started up.

According to the inventive technical solution, control can be carried out by 380 V three-phase or 220 V two-phase such that a problem caused by power source specifications of different clients can be solved. An oil supplying system which is comprised of the hydraulic circuit can be operated in a high-flow but low-pressure state such that requirements of fast operation under an unloaded condition can be met. Less hydraulic elements can be adopted in the hydraulic circuit and no throttle valve hydraulic element is needed such that power energy can be saved and the oil's temperature can be well controlled. The system can adjust the electric motor's frequency and rotating speed by adjusting hydraulic power. The required hydraulic power is generated by electric power controlled by the variable frequency controller. In contrast with a conventional system provided with a throttle valve, energy is saved. The electric control module employs a variable frequency power module by which the rotating speed of the electric motor can be completely controlled as required. Flow control of the hydraulic oil can be carried out only by controlling the rotating speed of the electric motor. The lift mechanism and the pusher head mechanism can be operated

at speeds which depend on different rotating speeds of the electric motor and can be adjusted by different flow controls of the hydraulic oil controlled by the variable frequency controller. The variable frequency controller can measure the electric motor's current and voltage and control its frequency and current curves to control the rotating speed of the electric motor. In the conventional system, the rotating direction of the electric motor is relevant to the power source's phase orders. If the phase orders are incorrect, the rotating direction of the electric motor is incorrect and thus the phase orders must be adjusted by the user. However, in the inventive system, the variable frequency controller is automatically adapted to the power source's phase orders in order to ensure that the rotating direction of the electric motor is correct. In the inventive system, the different actions of the different mechanisms are switched by the variable frequency controller. In the inventive system, a display is used to reveal the compactor's operation status thereon. The display comprises a touch screen by which operation of relevant components can be set. Signals from all components and the variable frequency controller can be shown on the display. When the waste compactor is unloaded, the controller can measure the load current and, based on the measured current, calculates out the pusher head's position.

Furthermore, in the inventive driving system, no pressure sensor is required and it is feasible to calculate out relevant load conditions only by measuring the load current and/or the load voltage of the electric motor when the pusher head is being operated.

Since the electric control module is adopted in the inventive driving system, the electric motor is operated in a variable frequency manner such that its starting current is reduced and thus a reduced impact can be applied on the power grid. The electric motor's noise is also reduced and it can be widely used. The variable frequency controller has a function of precise current protection. Therefore, no fuse protector or fuse is used any more. The controller can provide automatic recovery protection, according to the actual conditions, to prevent any overload case from happening. A control unit and a variable frequency module are combined into a variable frequency controller so as to reduce the space which is occupied by a control cabinet and to effectively leave a great space for the hydraulic system. The hydraulic circuit of the driving system is simplified. Less hydraulic elements are required. The hydraulic system has less thermal diffusivity and low failure rate. When the wastes are being lifted, the position of a bucket is determined by the current such that the bucket can be slowed down at its stroke's top most and

bottom most ends to reduce dust and noise. The variable frequency module is used to real-timely monitor the current and adjust the frequency based on the actual conditions, so as to reduce energy consumption. Actual tests show that the inventive technical solution can save power energy of 30% than a known control system.

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In conclusion, the present application provides a driving system for a waste compactor, especially a mobile waste compactor, comprising:

10 a hydraulic circuit, the hydraulic circuit being connected to a hydraulic cylinder assembly of a pusher head mechanism and a hydraulic cylinder assembly of a lift mechanism of the waste compactor so as to selectively drive one of the hydraulic cylinder assemblies, the hydraulic circuit including a hydraulic pump and an electric motor for driving the hydraulic pump, and the electric motor's load current being alterable depending on the driven hydraulic cylinder assembly's operating status; and

15 an electric control module for controlling the hydraulic circuit, wherein the hydraulic circuit includes a variable frequency controller connected to the electric motor to monitor the electric motor's load current and carry out speed regulation of the electric motor in a variable frequency manner, and the electric control module controls the action of the hydraulic cylinder assembly via the hydraulic circuit based on the load current of the electric motor.

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The basic principles of the present application have been illustratively explained here. It is appreciated by the skilled person in the art that some constituents can be altered as required. For instance, the electromagnetic reverse valve can be alternatively a three-position six-way valve in which a working position is added to stop supplying the hydraulic oil to either of the two hydraulic cylinders. Other reverse devices can be adopted in the present application as soon as they can realize the same function as the electromagnetic reverse valve. As an alternative, the PCL controller can be replaced by another suitable control circuit as soon as it can realize the same function.

30 Although some specific embodiments of the present application have been presented here, they are given for illustrative purposes only and cannot be thought to limit the scope of the present application. Any substitutions, alternations, and modifications can be made without departing from the spirit and scope of the present application.

CLAIMS

1. A driving system for a waste compactor, especially a mobile waste compactor,
5 comprising:

a hydraulic circuit, the hydraulic circuit being connected to a hydraulic cylinder
assembly of a pusher head mechanism and a hydraulic cylinder assembly of a lift
mechanism of the waste compactor so as to selectively drive one of the hydraulic
cylinder assemblies, the hydraulic circuit including a hydraulic pump and an electric
10 motor for driving the hydraulic pump, and the electric motor's load current being
alterable depending on the driven hydraulic cylinder assembly's operating status; and

an electric control module for controlling the hydraulic circuit, wherein the hydraulic
circuit includes a variable frequency controller connected to the electric motor to
monitor the electric motor's load current and carry out speed regulation of the electric
15 motor in a variable frequency manner, and the electric control module controls the
action of the hydraulic cylinder assembly via the hydraulic circuit based on the load
current of the electric motor.

2. The driving system as cited in claim 1, wherein the hydraulic circuit comprises an
20 electromagnetic reverse valve and a hydraulic oil tank for storing hydraulic oil, the
electromagnetic reverse valve is connected to the hydraulic cylinder assembly of the
pusher head mechanism and the hydraulic cylinder assembly of the lift mechanism, and
the electromagnetic reverse valve is controlled by the electric control module to be
selectively in communication with an oil path between one of the hydraulic cylinder
25 assemblies and the hydraulic oil tank.

3. The driving system as cited in claim 1 or 2, wherein each hydraulic cylinder assembly
comprises a hydraulic cylinder and a piston which is movable in a reciprocating manner
in the hydraulic cylinder, and the piston of the driven hydraulic cylinder assembly can
30 be moved in a direction depending on the electric motor's output rotating direction.

4. The driving system as cited in claim 3, wherein the piston of the driven hydraulic
cylinder assembly can be moved at a speed depending on the electric motor's output
power.

5. The driving system as cited in claim 3 or 4, wherein based on the monitored load current, the electric control module can calculate the operating status of the driven hydraulic cylinder assembly, for example a position of the piston in the hydraulic cylinder.

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6. The driving system as cited in any one of the preceding claims, wherein based on the monitored load current, the electric control module can control the pressure and/or flow of the hydraulic oil output by the hydraulic pump to control the action speed of the hydraulic cylinder assembly.

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7. The driving system as cited in any one of the preceding claims, wherein the hydraulic circuit further comprises a check valve and/or an overflow valve arranged in an oil path between the electromagnetic reverse valve and the hydraulic oil tank.

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8. The driving system as cited in any one of the preceding claims, wherein the electric control module comprises a touchscreen-type control panel on which a parameter of the driving system can be shown and set.

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9. The driving system as cited in any one of the preceding claims, wherein the electric control module determines the amount of wastes in the waste compactor based on the load current of the electric motor.

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10. A waste compactor, especially a mobile waste compactor, comprising a pusher head mechanism, a lift mechanism, and a driving system as cited in any one of the preceding claims for driving and controlling the two mechanisms.