CLAIMS

1. A method (8) for operating a train system (T) comprising the steps of:

generating (81) power by a power source (2);

transmitting (82) the power generated by the power source (2) through a drive arrangement (1) including:

an input shaft (3) connected to the power source (2);

an output shaft (5); and

a hybrid gearbox (4) comprising

layshaft gearbox (41), connected to the input shaft (3) and to the output shaft (5), and comprising a star carrier (413) configured to adjust the transmission speed ratio of the layshaft gearbox (41) between the input shaft (3) and the output shaft (5), and

a speed ratio motor-generator unit (42), configured to control the rotation of the star carrier (413);

driving (83) an equipment (L) connected to the output shaft (5); and

operating (84) the speed ratio motor-generator unit (42) to start up the power source (2), and then to decouple the load (L) from the power source (2), to adjust the rotation of the star carrier (413) to set the transmission speed ratio of the layshaft gearbox (41) so as to adjust the speed (ω_o) and the torque (C_o) at the output shaft (5) when the power source (2) is operated at constant speed (ω_i), characterized in that the power source (2) is a single-shaft gas turbine,

wherein the operating step (84) comprises the sub-steps of:

operating (841) the speed ratio motor generator unit (42) as a motor to bring the gas turbine (2) to its crank speed;

switching-off (842) the speed ratio motor generator unit (42) to decouple the single-shaft gas turbine (2) to accelerate and to reach its nominal speed, so that the star carrier (413) is free to spin; and

operating (843) the speed ratio motor-generator unit (42) as generator and slow-down the star carrier (413) to increase the output shaft (5) speed from stand-still condition.

2. The method (8) of claim 1, further comprising the step of operating (844) the speed ratio motor-generator unit (42) as motor increasing the speed of the star carrier (413) in an opposite direction than the operating step (843).

3. The method (8) of claim 1, further comprising the step of blocking (85) the output shaft (5) during the start-up phase of the power source (2) by a power balance motor-generator unit (6) associated to the output shaft (5).

4. A computer program, comprising instructions which, when the program is executed by a computer (7), causes the computer (7) to carry out the operating step (84) of the method of claim 1.

5. A computer-readable storage medium, comprising the instructions which, when executed by a computer (7), cause the computer to carry out the operating step (84) of the method of claim 1.