CLAIMS

What is claimed is:

1. A motor control system for motivating a movable partition, comprising:

a motor for mechanical coupling to the movable partition;

a switching circuit operably coupled to the motor for selectively coupling the motor to a positive power source and a negative power source responsive to one or more PWM signals;

an encoder configured for generating one or more rotation signals indicative of operational direction and operational speed of the motor; and

a motor controller operably coupled to the switching circuit and the encoder and configured for improving airflow around panels of the movable partition when a lead post of the movable partition is between a predefined position and a fully retracted position indicative of a billowing effect for the panels by adjusting pulse widths of the one or more PWM signals to control a rotational speed of the motor.

2. The motor control system of claim 1, wherein the motor control system is incorporated within a movable partition system, comprising:

a movable partition comprising coupled panels engaged with and movable along a track extending longitudinally between a first end and a second end; and

a lead post coupled to the movable partition and the track.

3. The motor control system of claim 1 or claim 2, wherein the motor controller is configured to adjust pulse widths of the one or more PWM signals to improve the airflow around the panels when the movable partition is being retracted.

4. The motor control system of claim 1 or claim 2, wherein the lead post comprises a lead drive box including the motor disposed therein.

5. The motor control system of claim 1 or claim 2, wherein the motor is positioned proximate the first end or the second end.

6. The motor control system of claim 1 or claim 2, further comprising:
a current sensor operably coupled between the motor and at least one of the positive power source and the negative power source and configured to generate a current signal indicative of current through the motor; and
wherein the motor controller is further configured for reducing current spikes to the motor during a startup phase of the motor, an ending phase of the motor, or a combination thereof by adjusting the pulse widths of the one or more PWM signals responsive to the current signal.

7. The motor control system of claim 1 or claim 2, further comprising:
a current sensor operably coupled between the motor and at least one of the positive power source and the negative power source and configured to generate a current signal indicative of current through the motor; and
wherein the motor controller is further configured for reducing stresses on mechanical components operably coupled between the motor and the movable partitions during a startup phase of the motor, an ending phase of the motor, or a combination thereof by adjusting pulse widths of the one or more PWM signals responsive to the current signal.

8. The motor control system of claim 1 or claim 2, wherein the motor controller is further configured for generating the one or more PWM signals to adjust a rotational direction of the motor.

9. The motor control system of claim 8, wherein:
the switching circuit comprises an H-bridge configuration of switches; and
the motor controller is further configured for generating the one or more PWM signals as four signals configured for operating the H-bridge configuration of switches to cause rotation of the motor by pulse-width modulating at least one of the four signals.

10. The motor control system of claim 1 or claim 2, wherein the motor controller is further configured for:

determining the movable partition is between the predefined position and the fully retracted position by analyzing the one or more rotation signals; and

determining the rotational speed of the motor and a proportional linear position of the movable partition by analyzing the one or more rotation signals relative to a known time base.

11. The motor control system of claim 1 or claim 2, wherein the one or more rotation signals comprise quadrature signals.

12. A method of moving a movable partition along a track, comprising:

actuating a motor operably coupled to the movable partition to drive rotation of the motor at a rotational speed and cause the movable partition to move along the track at a linear speed proportional to the rotational speed; and

enabling improved airflow around panels of the movable partition when the movable partition reaches a predefined position relative to a fully retracted configuration by reducing the rotational speed of the motor when a lead post of the movable partition is between the predefined position and a fully retracted position.

13. The method of claim 12, wherein enabling the improved airflow around the panels is performed when the movable partition is being retracted.

14. The method of claim 12, wherein reducing the rotational speed of the motor when the movable partition is retracting and the lead post of the movable partition is between the predefined position and the fully retracted position occurs with the lead post comprising a lead drive box including the motor disposed therein.

15. The method of claim 12, further comprising reducing current spikes to the motor during a startup phase of the motor, an ending phase of the motor, or a

combination thereof by adjusting pulse widths of one or more PWM signals operably coupled between a motor controller and the motor.

16. The method of claim 12, further comprising reducing stresses on mechanical components operably coupled between the motor and the movable partitions during a startup phase of the motor, an ending phase of the motor, or a combination thereof by adjusting pulse widths of one or more PWM signals operably coupled between a motor controller and the motor.

17. The method of claim 12, wherein actuating the motor comprises supplying one or more PWM signals to the motor to cause the rotation of the motor, control a direction of rotation of the motor, and control a speed of the motor.

18. The method of claim 17, wherein supplying one or more PWM signals to the motor comprises supplying four signals configured for controlling the motor through an H-bridge configuration of switches operably coupled to the motor and pulse-width modulating at least one of the four signals.

19. The method of claim 12, wherein determining the movable partition is between the predefined position and the fully retracted position is performed by a motor controller operably coupled to an encoder configured for generating quadrature signals indicating operational direction and speed of the motor and, responsive to the quadrature signals relative to a known time base, the controller determines a position of the motor and a proportional linear position of the movable partition.

CLAIMS

1. A motor control system for motivating a movable partition, comprising:

a motor for mechanical coupling to the movable partition;

a switching circuit operably coupled to the motor for selectively coupling the motor to a positive power source and a negative power source responsive to one or more PWM signals;

an encoder configured for generating one or more rotation signals indicative of operational direction and operational speed of the motor; and

a motor controller operably coupled to the switching circuit and the encoder and configured for improving airflow around foldable panels of the movable partition and reducing a billowing effect caused by air between the foldable panels by adjusting pulse widths of the one or more PWM signals from a previous pulse width to control a rotational speed of the motor responsive to a determination that the movable partition is in a position that is between a predefined position and a fully retracted position.

2. The motor control system of claim 1, wherein the motor controller is configured to adjust pulse widths of the one or more PWM signals to improve the airflow around the foldable panels when the movable partition is being retracted.

3. The motor control system of claim 1, wherein the lead post comprises a lead drive box including the motor disposed therein.

4. The motor control system of claim 1, further comprising:

a current sensor operably coupled between the motor and at least one of the positive power source and the negative power source and configured to generate a current signal indicative of current through the motor; and

wherein the motor controller is further configured for reducing current spikes to the motor during a startup phase of the motor, an ending phase of the motor, or a combination thereof by adjusting the pulse widths of the one or more PWM signals responsive to the current signal.

5. The motor control system of claim 1, further comprising:

a current sensor operably coupled between the motor and at least one of the positive power source and the negative power source and configured to generate a current signal indicative of current through the motor; and

wherein the motor controller is further configured for reducing stresses on mechanical components operably coupled between the motor and the movable partitions during a startup phase of the motor, an ending phase of the motor, or a combination thereof by adjusting pulse widths of the one or more PWM signals responsive to the current signal.

6. The motor control system of claim 1, wherein the motor controller is further configured for generating the one or more PWM signals to adjust a rotational direction of the motor.

7. The motor control system of claim 6, wherein:

the switching circuit comprises an H-bridge configuration of switches; and

the motor controller is further configured for generating the one or more PWM signals as four signals configured for operating the H-bridge configuration of switches to cause rotation of the motor by pulse-width modulating at least one of the four signals.

8. The motor control system of claim 1, wherein the motor controller is further configured for:

determining if the movable partition is between the predefined position and the fully retracted position by analyzing the one or more rotation signals; and

determining the rotational speed of the motor and a proportional linear position of the movable partition by analyzing the one or more rotation signals relative to a known time base.

9. The motor control system of claim 1, wherein the one or more rotation signals comprise quadrature signals.

10. A movable partition system, comprising:

a movable partition comprising coupled foldable panels engaged with and movable along a track extending longitudinally between a first end and a second end;

a lead post coupled to the movable partition and the track; and

a motor control system, comprising:

a motor for mechanical coupling to the movable partition;

a switching circuit operably coupled to the motor for selectively coupling the motor to a positive power source and a negative power source responsive to one or more PWM signals;

an encoder configured for generating one or more rotation signals indicative of operational direction and operational speed of the motor; and

a motor controller operably coupled to the switching circuit and the encoder and configured for improving airflow around foldable panels of the movable partition and reducing a billowing effect caused by air between the foldable panels by adjusting pulse widths of the one or more PWM signals to control a rotational speed of the motor responsive to a determination that the lead post of the movable partition is between a predefined position and a fully retracted position.

11. The movable partition system of claim 10, wherein the motor controller is configured to adjust pulse widths of the one or more PWM signals to improve the airflow around the foldable panels when the movable partition is being retracted.

12. The movable partition system of claim 10, wherein the lead post comprises a lead drive box including the motor disposed therein.

13. The movable partition system of claim 10, wherein the motor is positioned proximate the first end or the second end.

14. The movable partition system of claim 10, further comprising:

a current sensor operably coupled between the motor and at least one of the positive power source and the negative power source and configured to generate a current signal indicative of current through the motor; and

wherein the motor controller is further configured for reducing current spikes to the motor during a startup phase of the motor, an ending phase of the motor, or a combination thereof by adjusting the pulse widths of the one or more PWM signals responsive to the current signal.

15. The movable partition system of claim 10, further comprising:

a current sensor operably coupled between the motor and at least one of the positive power source and the negative power source and configured to generate a current signal indicative of current through the motor; and

wherein the motor controller is further configured for reducing stresses on mechanical components operably coupled between the motor and the movable partition during a startup phase of the motor, an ending phase of the motor, or a combination thereof by adjusting pulse widths of the one or more PWM signals responsive to the current signal.

16. The movable partition system of claim 10, wherein the motor controller is further configured for generating the one or more PWM signals to adjust a rotational direction of the motor.

17. The movable partition system of claim 16, wherein:

the switching circuit comprises an H-bridge configuration of switches; and

the motor controller is further configured for generating the one or more PWM signals as four signals configured for operating the H-bridge configuration of switches to cause rotation of the motor by pulse-width modulating at least one of the four signals.

18. The motor control system of claim 1, wherein the motor controller is further configured for:

determining the movable partition is between the predefined position and the fully retracted position by analyzing the one or more rotation signals; and

determining the rotational speed of the motor and a proportional linear position of the movable partition by analyzing the one or more rotation signals relative to a known time base.

19. The motor control system of claim 1, wherein the predefined position is a position indicative of the billowing effect occurring for the foldable panels of the movable partition system.

20. The motor control system of claim 1, wherein the motor controller is further configured for maintaining the pulse widths of the one or more PWM signals in a steady state responsive to a determination that the movable partition is in a position that is prior to the predefined position.

21. The motor control system of claim 1, wherein adjusting pulse widths of the one or more PWM signals from a previous pulse width includes decreasing the pulse widths by a delta amount.

22. The motor control system of claim 1, wherein adjusting pulse widths of the one or more PWM signals from a previous pulse width includes increasing the pulse widths by a delta amount.

23. The movable partition system of claim 10, wherein the predefined position is a position indicative of the billowing effect occurring for the foldable panels of the movable partition system.

24. The movable partition system of claim 10, wherein the motor controller is configured for adjusting the pulse widths of the one or more PWM signals by decreasing the pulse widths in a linear manner as the lead post moves between the predefined position and the fully retracted position during retraction.

25. The movable partition system of claim 10, wherein the motor controller is configured for adjusting the pulse widths of the one or more PWM signals by decreasing the pulse widths in a parabolic manner as the lead post moves between the predefined position and the fully retracted position during retraction.

26. The movable partition system of claim 11, wherein the motor controller is configured to maintain the pulse widths of the one or more PWM signals in a steady state prior to the lead post reaching the predetermined location during retraction.