## Powerlouvre™ Window Electrical Requirements & Wiring

- Operating voltage: 24V DC
- Maximum constant current: 0.25A per motor
- Maximum startup current   0.5A per motor
- Opening time: Approx 14 seconds
- Working temperature: -20 to +60 degrees Celsius

Note: In extreme cold conditions the windows will not operate if there is excessive ice build up or if the louvre blades are frozen together.

Maximum Constant Current Requirements			
Powerlouvre Window Type	Motors per bay	Maximum Constant Current Required	Maximum Instantaneous Start Up Current Required
2-9 Blades High	1	0.25 amps per bay	0.5 amps per bay
10-18 Blades High	2	0.5 amps per bay	1.0 amps per bay

The direction in which the Powerlouvre Window moves is determined by the polarity of the low voltage current supplied. Once the Powerlouvre Window has fully opened or fully closed, an electronic circuit stops power being delivered to the motors to prevent the motor being damaged should power be supplied continuously.
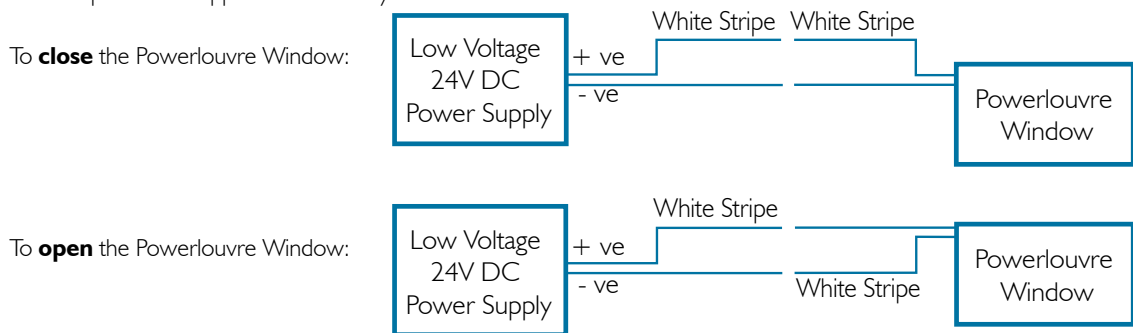
To **close** the Powerlouvre Window:

To **open** the Powerlouvre Window:

Battery Backup

The Powerlouvre Window has no integrated battery back up. If the power supply fails the window cannot be operated. If battery back up is required, systems are readily available and can be integrated by qualified suppliers.

Breezway® Transformers

Breezway supplies transformers (as an optional extra) that have been specified to meet the particular requirements of Powerlouvre Windows.

- 240V AC current transformed to 1.5 amp, 24V DC constant current, suitable for powering up to 6 Powerlouvre Motors.
- Able to provide sufficient instantaneous startup current for up to 6 Powerlouvre Motors.
- Built-in overload protection to prevent accidental short circuits from damaging the transformer.

The output of Breezway transformers can be wired together in parallel if more than 1.5 amps of current is required.

It is recommended that transformers are located in a position that enables easy power cycling.

Controlling Powerlouvre™ Windows

Control options include:

- Breezway Powerlouvre Apptivate® Control Units, which allow control via a touch sensitive wall plate, remote control via a smartphone application, or automatic operation in response to temperature or timer events.
- Building management systems, which allow control along with other automated building products and automatic operation in response to various sensors and inputs.
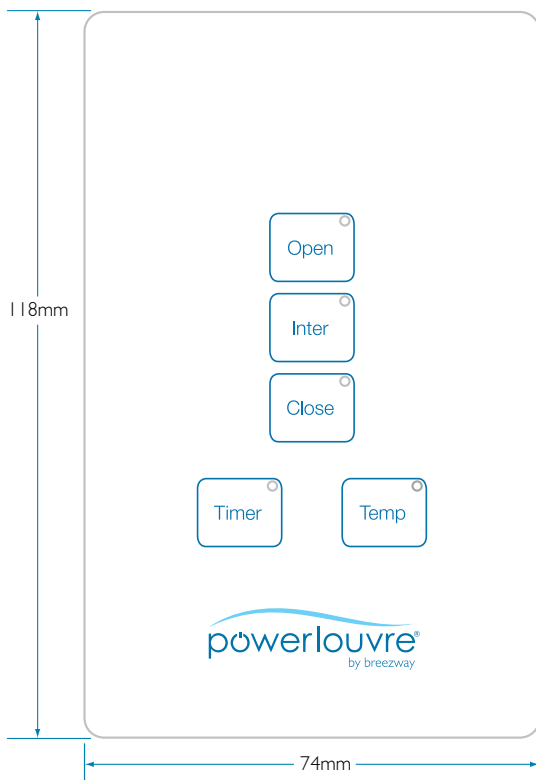
Powerlouvre™ Apptivate® Control Unit

The Powerlouvre Apptivate Control Unit is a plastic, touch-sensitive wall switch.
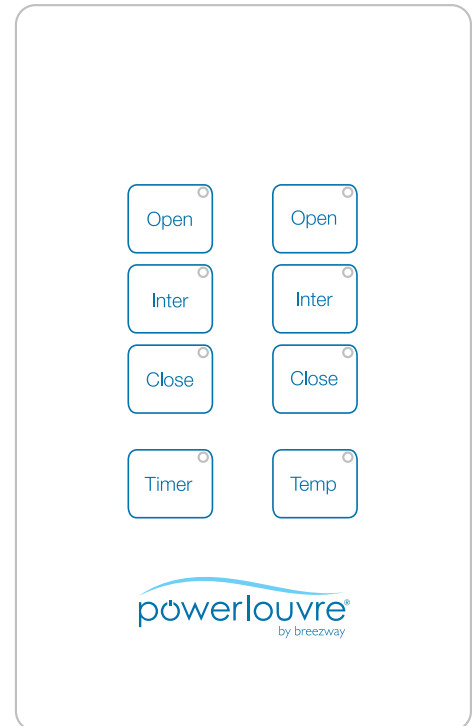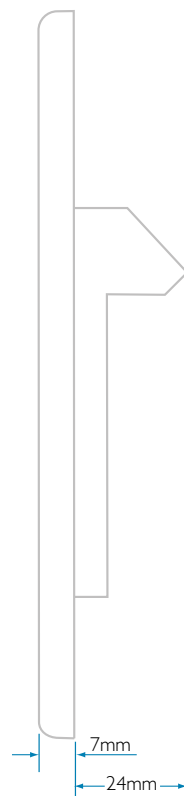
Features include:

- White, standard sized wall switch.
- Single channel and dual channel models.
- Control of up to 6 Powerlouvre Motors per channel.
- Fully open, fully close or open to an intermediate (half-open) position at a single touch.
- Precise control of opening angle by touching and then releasing when the window is in the desired position, or by touching another button to stop the window in the desired position.
- Automatic operation in response to an in-built temperature sensor.
- Bluetooth® module to allow control by and communication with compatible smartphones and tablets.

Additional features accessible through the Powerlouvre™ App:

- Remote control.
- Automatic operation in response to an in-built temperature sensor.
- Automatic operation in response to pre-set timers.
- 'Night mode' which adjusts the brightness of LED lights overnight to minimise potential sleep disruptions.

118mm

Open

Inter

Close

Timer   Temp

powerlouvre®
by breezway

74mm

7mm

24mm

**Apptivate® Control Unit
Single Channel**

Open   Open

Inter   Inter

Close   Close

Timer   Temp

powerlouvre®
by breezway

**Apptivate® Control Unit
Dual Channel**

Powerlouvre™ App

The Apptivate® Control Unit includes a Bluetooth® Smart™ modules which allows wireless communication between a compatible device running the Powerlouvre App and the Apptivate Control Unit.

Remote control.

The Powerlouvre app enables:
- Remote opening and closing of each Apptivate Control Unit. The range of the Bluetooth signal is approximately 10m - 20m. (The range will be maximised by maintaining a clear line of sight between the device running the Powerlouvre App and the Apptivate Control Unit.)
- Naming of Apptivate Control Units, and channels of Apptivate Control Units for easy identification.
- An indication of the open/close position of the Powerlouvre Windows connected to each Apptivate Control Unit.

Compatible devices.

Compatible devices will have Bluetooth® Smart™ modules installed and have an iOS or Android operating system. Devices include:
Apple products running iOS 7 or newer:
- iPhone 4s and newer
- iPad 3 and newer
- iPad Mini and newer
- iPod Touch 5
Devices running Android 4.3 and newer, including:
- Samsung Galaxy Range
- HTC One, MAX
- Sony Experia Range
- Droid RAZR, Ultra, Maxx, Mini
- Google Nexus 4, Nexus 5, Nexus 7 and Nexus 10

Security.

Establishing associations between the Powerlouvre App and Apptivate Control Units requires:
- Close physical proximity between the Powerlouvre App and the Apptivate Control Unit, and
- An access code (defined by the first Powerlouvre App to be associated to the Apptivate Control Unit).

If the Access Code is forgotten, a factory reset button can be activated by snapping off the front cover plate of the Apptivate Control Unit and pushing a paperclip through a small hole to hold a button down for a brief period.   Security will be maximised by positioning the Apptivate Control Unit in a location that restricts unauthorised access.

If restricting access to the Apptivate Control Unit is not practical then users can seal the hole to block access to the factory reset button from the front panel necessitating the unscrewing of the Apptivate Control Unit from the wall in order to carry out a factory reset.

Automatic operation in response to temperature.

Temperatures can be set at which the Apptivate Control Unit will:
- Automatically open the windows to naturally cool the room, or
- Automatically close the windows to retain warmth within the room.

Automatic response to temperature can be enabled or disabled:
- Remotely from the Powerlouvre App, or
- Directly on the Apptivate Control Unit.

Notes:
- As the temperature sensor will be located within the wall cavity it may be susceptible to environmental conditions so the temperature readings will be indicative of the air temperature within the room, but will not exactly reflect the air temperature within the room.
- When responding to temperatures both channels of Dual Channel Apptivate Control Units will respond simultaneously to the temperature sensor.
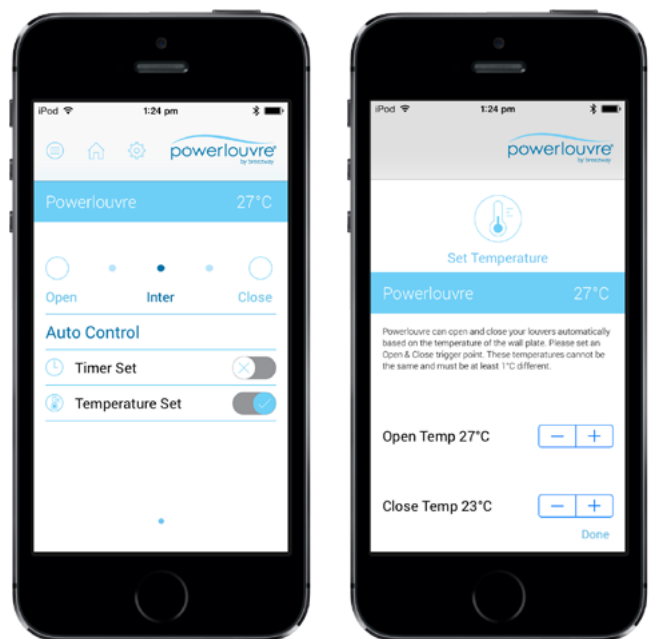
Automatic operation in response to timers.

Timer events (time of day and day of week) can be set to:
- Open the windows
- Move the window to an intermediate position
- Close the windows
- Begin responding automatically to temperatures.

This allows the windows to be set to operate in anticipation of the building occupant's daily routine. For example, opening before employees arrive to pre-cool the building, or responding to temperatures from when a homeowner goes to bed so that the windows close when the temperature drops in the early hours of the morning.

Timer events can be enabled or disabled:
- Remotely from the Powerlouvre™ App, or
- Directly on the Apptivate® Control Unit.

This allows timer events to easily be disabled as the homeowner leaves the house or enabled as they arrive home.

Note:
- When responding to timer events both channels of Dual Channel Apptivate Control Units will respond simultaneously.

Control of multiple Apptivate® Control Units.

Up to 6 Apptivate Control Units can be associated to each Powerlouvre App allowing building occupants to control windows around their home from their Powerlouvre App.

For ease of identification:
- Each of the Apptivate Control Units can be given a customised name.
- Each of the channels of a Dual Channel Apptivate Control Unit can be given a customised name.
- The Powerlouvre App will indicate any Apptivate Control Units which are out of range, or with which a Bluetooth® Smart connection cannot be made.

For maximum control and ease of use, all the Apptivate Control Units associated to a Powerlouvre App can be operated simultaneously or independantly.

Control by multiple Powerlouvre™ Apps.

Associations can be established between multiple Powerlouvre Apps and each Apptivate Control Unit, to allow all family members to control the windows from their smartphones.

Note:
- Only one Powerlouvre App will be able to maintain an active Bluetooth® Smart connection with an Apptivate Control Unit at any given time.

For example: Both John and Mary's Powerlouvre Apps are associated to the Apptivate Control Unit operating the Powerlouvre Windows in their living room. If John opens the windows using his Powerlouvre App, Mary will not be able to close the windows using her Powerlouvre App until John minimises the Powerlouvre App on his smartphone or his smartphone enters 'sleep' mode.

Apptivate® Control Unit Standard Wiring

Powerlouvre™ Motors and Apptivate Control Units require 24v DC power. For ease of wiring the Apptivate Control Unit senses the polarity of the current provided from the transformer and automatically adjusts accordingly.

Up to 6 Powerlouvre Motors can be wired in parallel to each Apptivate Control Unit motor group.
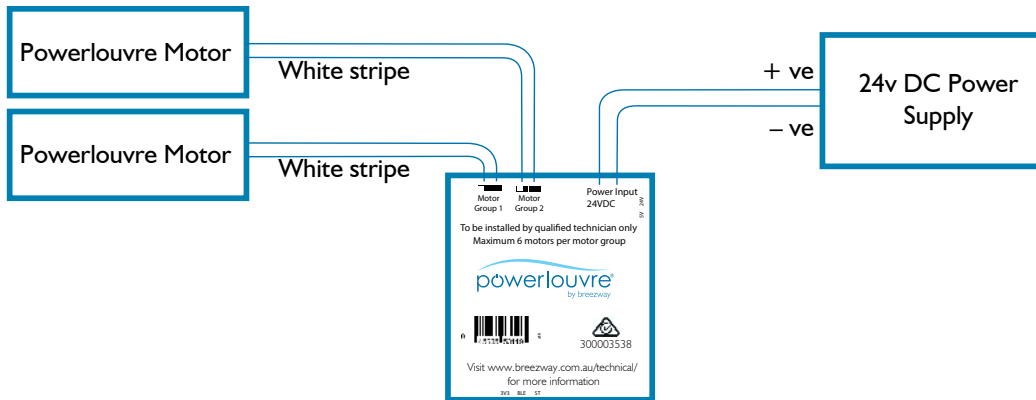
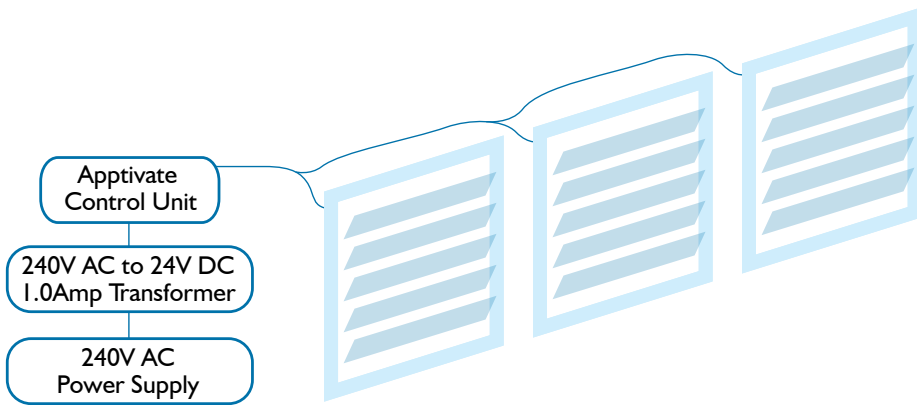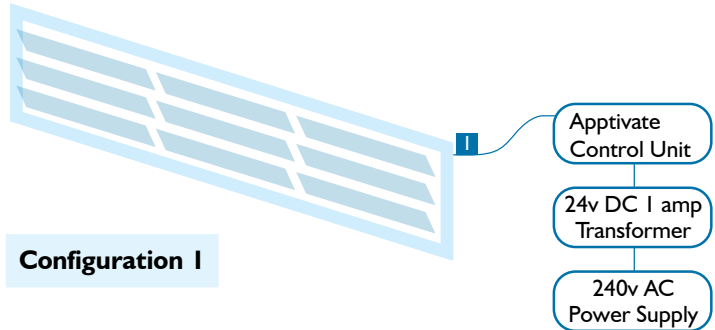**Dual Channel Apptivate® Control Unit Wiring**
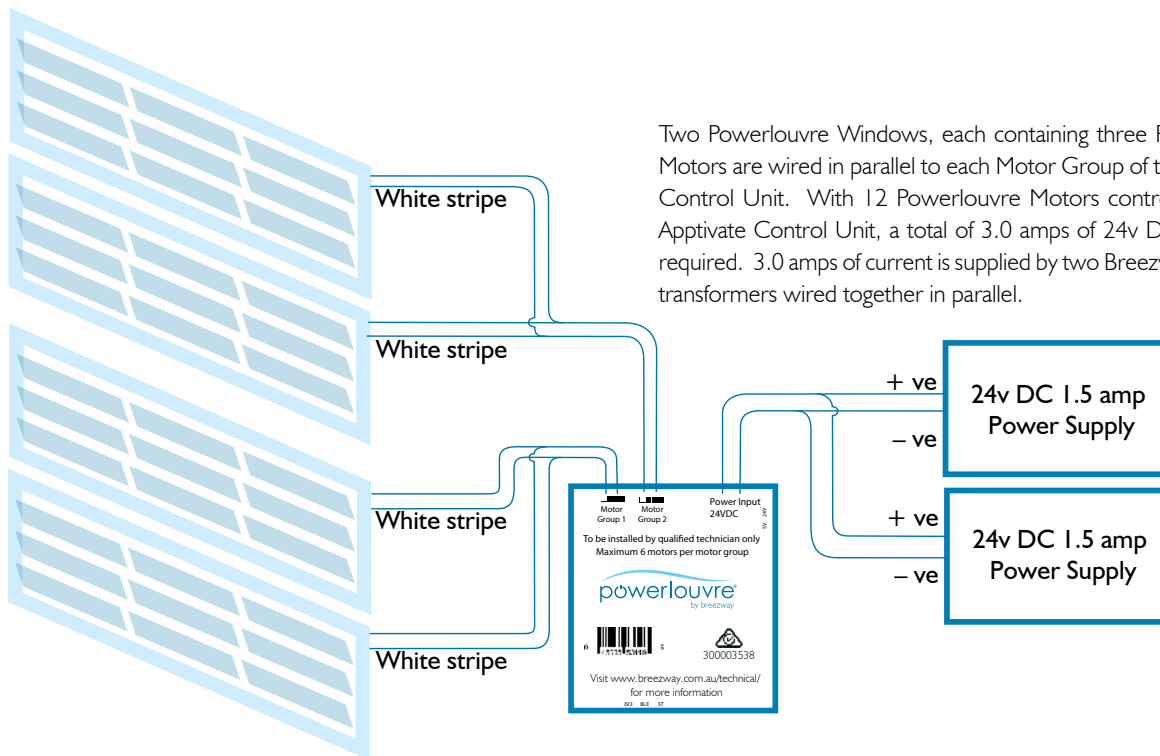
Two Powerlouvre Windows, each containing three Powerlouvre Motors are wired in parallel to each Motor Group of the Apptivate Control Unit. With 12 Powerlouvre Motors controlled by the Apptivate Control Unit, a total of 3.0 amps of 24v DC current is required. 3.0 amps of current is supplied by two Breezway 1.5 amp transformers wired together in parallel.

Apptivate® Control Unit Wiring With Multiple Transformers
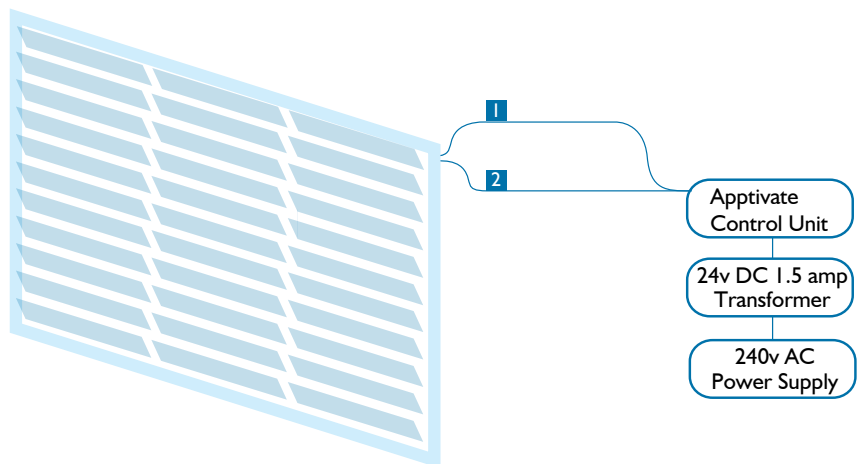
Apptivate® Control Unit Configuration Examples

All bays of the window are operated simultaneously by a single channel Apptivate Control Unit.

Configuration 1

> Apptivate Control Unit
>
> 24v DC 1 amp Transformer
>
> 240v AC Power Supply

Apptivate Control Unit

240V AC to 24V DC 1.0Amp Transformer

240V AC Power Supply

All three windows are operated simultaneously by a single channel Apptivate Control Unit.
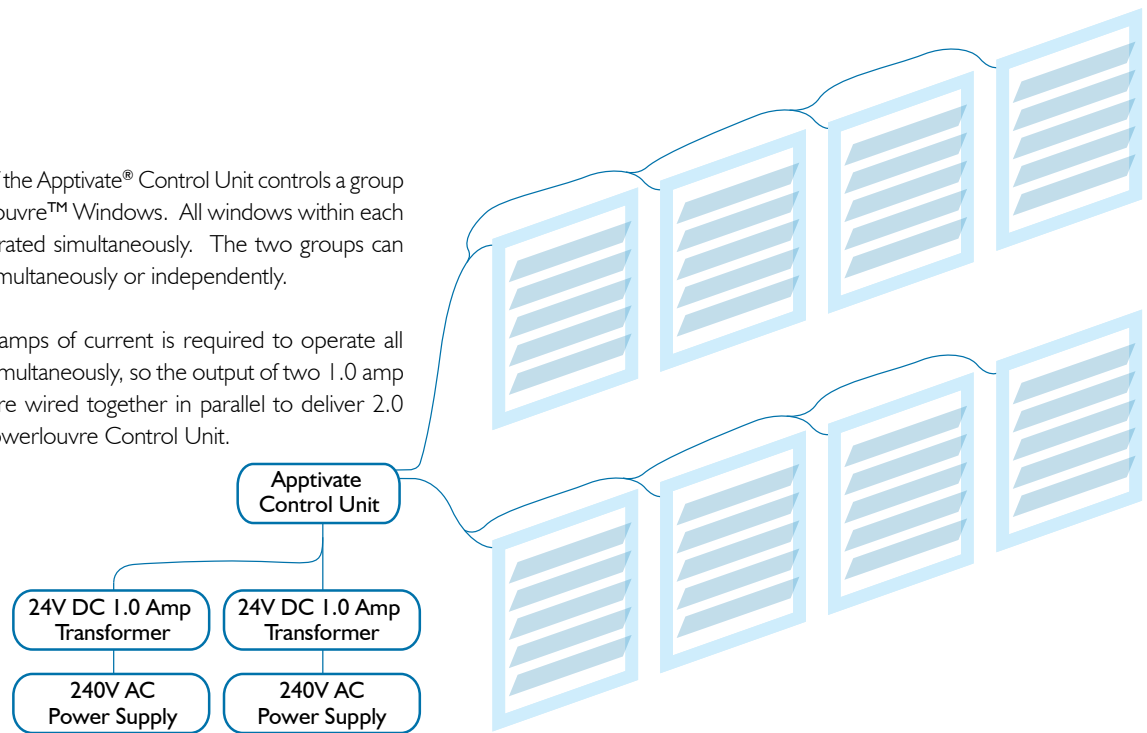
Configuration 2

The motors operating the blades in the top half of the window and the motors operating the blaces in the bottom half of the window are all wired to a single channel Apptivate Control Unit. All the blades in the window will be operated simultaneously.

> Apptivate Control Unit
>
> 24v DC 1.5 amp Transformer
>
> 240v AC Power Supply

Configuration 3

Each channel of the Apptivate® Control Unit controls a group of four Powerlouvre™ Windows. All windows within each group are operated simultaneously.   The two groups can be operated simultaneously or independently.

A total of 2.0 amps of current is required to operate all eight motors simultaneously, so the output of two 1.0 amp transformers are wired together in parallel to deliver 2.0 amps to the Powerlouvre Control Unit.

Apptivate Control Unit

24V DC 1.0 Amp Transformer

24V DC 1.0 Amp Transformer

240V AC Power Supply
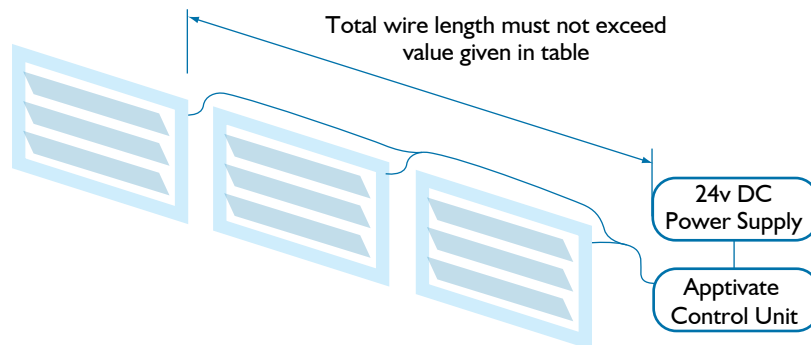
240V AC Power Supply

Configuration 4

Building Management System Compatibility

The Altair® Powerlouvre Window System has been reviewed for compatibility by the leading suppliers of building management systems. When considering integration into a building management system, the following should be considered:
- Breezway does not supply the various sensors which could be used to instigate opening or closing of the windows (eg temperature or rain sensors).
- Transformer requirements may differ from the requirements of Powerlouvre Windows controlled by Apptivate Control Units.
- The Powerlouvre Window System does not include an inbuilt electronic mechanism to inform the building management system of its current open or close position.
- Powerlouvre Motors include limit switches which prevent the motors from continuing to attempt to open or close the window once the window is fully open or fully closed, thereby preventing damage to the motors and electronics.

Apptivate Control Units are not compatible with building management systems.

breezway®

Powerlouvre™ Window Cabling Requirements

Total wire length must not exceed
value given in table

24v DC
Power Supply

Apptivate
Control Unit

Total wire length does not include the internal
wiring of each Powerlouvre Window.

Multiple Windows in parallel

Wire Size ⇩	Motors ⇨	Max Distance from Power Supply to Motor								
		1	2	3	4	5	6	8	10	12
0.5mm²	20AWG	60m	30m	20m	15m	12m	10m	-	-	-
0.8mm²	18AWG	90m	45m	30m	23m	18m	15m	-	-	-
1.3mm²	16AWG	150m	75m	50m	38m	30m	25m	20m	15m	12m
2mm²	14AWG	230m	120m	80m	60m	50m	40m	30m	24m	20m
3.5mm²	12AWG	370m	185m	125m	90m	75m	60m	45m	35m	30m
4mm²	10AWG	550m	294m	200m	150m	120m	100m	75m	55m	45m
10mm²	8AWG	1000m	500m	330m	250m	200m	150m	120m	100m	80m
17mm²	6AWG	1500m	750m	500m	375m	300m	250m	175m	150m	125m
26mm²	4AWG	8000m	4000m	2500m	2000m	1500m	1250m	1000m	800m	650m

Tables calculated using a window current of 0.25A and a voltage drop of 5% or 1 V @ 24V.

Battery Backup

The Powerlouvre Window has no integrated battery back up. If the power supply fails the window cannot be operated. If battery back up
is required, systems are readily available and can be integrated by qualified suppliers.