WCC 106 UL

Installation instruction

MotorController

(Version 2402)

Save this installation manual for the end user

The latest version of this document can always be found on our website

US +1 215 699 9292 / +1 650 360 5414 info.us@windowmaster.com
Others +45 45 670 300 info.dk@windowmaster.com

windowmaster.com

1 Safety regulations

1.1 Safety

Only allow correspondingly trained, qualified and skilled personnel to carry out installation work.

Reliable operation and the avoidance of damage and hazards are only guaranteed if installation and settings are carried out carefully in accordance with these instructions.

There may be personal danger by electrically operated windows:

- the forces occurring in the automatic mode can be such that parts of the body could get crushed.
- when opened, actuators (spindles) could protrude into the room.

For this reason, measures have to be taken prior to starting up the actuators, which exclude the danger of injury.

For safety reasons we recommend to install opening restrictors on bottom-hung windows.

In the event that windows are subjected to rain and/or high wind loads, we recommend connecting a wind/rain sensor to the MotorController for the automatically closing of the windows.

The MotorController is to be located in a safe place, protected from the effects of fire and smoke.
The MotorController is to be surface mounted.
The MotorController is supplied by 120V AC.
The manufacturer does not assume any liability for possible damage resulting from inappropriate use.

1.2 120V AC

120V AC can cause death, severe bodily injury or significant damage to property.
The MotorController must be disconnected from the power supply before being opened, mounted or performing any alteration of the construction.
Power supply to the MotorController must be done via external two-pole or multi-pole circuit breaker. The MotorController is to be supplied with Phase conductor, Neutral conductor and Earth conductor

Applicable national regulations must be complied with.

1.3 Application

The MotorController is solely designed for the automatic opening and closing of windows, flaps and doors.
Always check that the system complies with applicable national regulations.
The cable cross section will depend on wire length and power consumption. See chapter “Cable dimensioning”.

1.4 Cabling and electrical connection

WindowMaster recommends powering the MotorController from its own group.
Cable routing and connection - adhere to national regulations.
Establish the cable types, if necessary, with the local approval bodies.
Do not conceal flexible cables.
Junction box must be accessible for maintenance purposes.
Disconnect all poles of the mains voltage prior to starting maintenance work or making changes to the system.
Secure the system to prevent unintentional switching on again.

Route all low voltage cables (24VDC) separate from the power current cables. Design cable types, lengths and cross sections in accordance with the technical information. Cable specifications is a guide only, the overall responsibility resides with the electrical contractor on site. Installation must be in accordance with the national electrical regulations.

2 Introduction to WCC 106

WCC 106 is a MotorController that controls (opens/closes) 1 or more ±24V DC standard or MotorLink® window actuators on the basis of a signal the connected components e.g. comfort keypad (operating keypad), room sensors and weather sensors.

We recommend always connecting comfort keypad when sensors and other operators are connected so users always, via the comfort keypads, can override the signals and open or close windows themselves should there be a need for more or less fresh air.

2.1 The MotorController’s construction

The MotorController contains a 150W primary power supply (SMPS - switched mode power supply) and a printed circuit board with input, output and auxiliary supply (AUX).

WCC 106 has 2 motor lines to which ±24V DC standard actuators or MotorLink® actuators can be connected; the number of connected actuators depends on the actuator type; the following table lists the max number of actuators. Total power consumption for all connected motors incl. load on X7 (AUX max 0.5A) may not, however, exceed 6A.

2.2 Max number of actuators per MotorController

The table shows the maximum number of actuators which can be connected to the WCC 106. The total power consumption for all connected actuators incl. load on X7 (AUX max 0.5A) may not exceed 6A.

	Per motor line		Per MotorController	
	± 24V actuators	MotorLink® actuators	± 24V actuators (2 motor lines)	MotorLink® actuators (2 motor lines)
WMD 820-1	4	4	6	6
WMD 820-2	4	2	6	4
WMD 820-3	3	3	6	6
WMD 820-4	4	4	4	4
WMU 831 / 851-1	4	4	6	6
WMU 831 / 851-2	4	2	6	4
WMU 831 / 851-3	3	3	6	6
WMU 831 / 851-4	4	4	4	4
WMU 836-1	2	2	4	4
WMU 836-2	2	2	4	4
WMU 852-1	2	2	3	3
WMU 852-2	2	2	2	2
WMU 861-1	2	2	4	4
WMU 861-2	2	2	4	4
WMU 842 / 862 / 882-1	2	2	3	3
WMU 842 / 862 / 882-2	2	2	2	2
WMU 863 / 883-1	1	1	2	2
WMU 864 / 884-1	1	1	1	1
WMX 503 / 504 / 523 / 526-1	8	4	12	8
WMX 503 / 504 / 523 / 526-2	6	2	12	4
WMX 503 / 504 / 523 / 526-3	6	3	12	6
WMX 503 / 504 / 523 / 526-4	8	4	12	8
WMX 803 / 804 / 813 / 814 / 823 / 826-1	4	4	6	6
WMX 803 / 804 / 813 / 814 / 823 / 826-2	4	2	6	4
WMX 803 / 804 / 813 / 814 / 823 / 826-3	3	3	6	6
WMX 803 / 804 / 813 / 814 / 823 / 826-4	4	4	4	4
WML 860-1	3	3	6	6
WML 860-2	2	2	4	4
WML 860-3	3	3	6	6
WMB 801/802*	2	2	4	4
WMB 811/812/815/816/817/818 */***	2	2	4	4

*do not exceed the total power consumption of the motor line

**with 2 locking actuators on the same motor line use: 1 x WMB 811 and 1 x WMB 812, 1 x WMB 815 and 1 x WMB 816 or 1 x WMB 817 and 1 x WMB 818

3 Accessories

Accessories	
Rain sensor	WLA 331
Rain / windspeed sensor	WLA 330
Key switch	CL - 2354
Momentary rocker switch	CL - 1631
Comfort keypad, model FUGA, surface mounting	WSK 103
Room thermostat: temperature (Celsius based)	WLA 110

4 Technical data

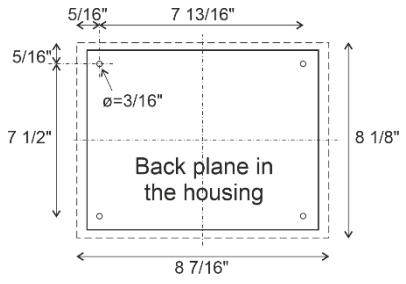
Technical data		
Output current	6A incl. load on X7 (max 0.5A)	
Secondary voltage	Voltage Resting potential with 120V AC without load Ripple with full load	24V DC (±15%) 24V DC @ 20°C 200mVp-p
AUX	24V DC, 500mA	
Motor groups / Motor lines	Up to 2 motor groups with each 1 motor line Either ±24V standard actuators or MotorLink® actuators can be connected to the MotorController	
Primary voltage	100-240 VAC 1.7A 50/60Hz	
Power consumption	Idling < 0.5W Full load 150W	
Leakage current	Max 0.75mA @ 240VAC	
Inrush current on primary side	40A< 5ms w. 120V Max. 3 x WCC 106 per 10A power supply group. Circuit breaker “C” type.	
±24V	Min. 500ms	
LED signalling	3 green LEDs and 1 yellow indicate via blinking sequences failure and/or status of the system and motor line. See paragraph on “Status and troubleshooting via LED on the MotorController” for a detailed description and blinking sequences.	
Connection cable	Actuators Other components	flexible max. AWG 10 / solid max. AWG 8 min AWG 24 / max. AWG 16
Operating conditions	+23°F - +113°F, for indoor mounting, the MotorController must not be covered	
Max actuator activation duration (duty cycle)	ED 40% (4 min. per 10 min.)	
Material	Plastic	
Color	White (RAL 9016)	
Size	8 7/16" x 8 1/8" x 1 7/16" (W x H x D)	
Weight	2.03 lbs	
Protection class	IP 20	
Safety class	I (with PE)	
Delivery	MotorController with 6' 6 3/4'' cable with US plug (type B)	
Note	We reserve the right to make technical changes	

5 Mounting

The MotorController may either be mounted horizontally or vertically on a wall.

The MotorController is fixed to the wall through the back plate’s Ø3/16’’ mounting holes.

The MotorController should be mounted in a secure location so that it is protected against the effects of fire and smoke.



6 Installation

6.1 Cable routing

The safety regulations in these guidelines must be closely followed. Regarding low power cable configuration we refer you to the chapter “Cable dimensioning”. The cable cross sections listed in the table of cable lengths must not be reduced.

The cables are led into the MotorController’s cabinet via cut-outs in the bottom.

When routing cables, all applicable national regulations must be complied with.
The MotorController is supplied with a 6' 6 ¾" cable with US plug (type B).

6.2 Connecting cables in the MotorController

Cables are to be connected in accordance with the chapter “Connection plan for WCC 106”, the short chapters and other relevant paragraphs in these guidelines.
Please ensure that connections are correctly executed - incorrect connection can lead to functional failure in the MotorController or external products.

The installation must at all times adhere to the applicable regulations, standards and guidelines.

6.3 Connecting protective earth and 120V AC

WCC 106 is factory-fitted with a power supply cable with a 120V US plug with earth wire (type B).

6.4 Installation of comfort keypad

Any comfort keypad should be mounted in a visible position and within easy reach.

6.5 Assembly instructions

Always have assembly, installation, repair and maintenance of ventilation systems carried out by qualified personnel trained for this purpose.

Rules to be adhered to for setting up and installation
National regulation and guidelines have to be adhered to when planning the use of a ventilation system and its set-up and Installation.

Accident prevention regulations Adhere to the general accident prevention regulations (APR), the APR for power operated windows and doors, and the installation rules in your country.

Caution:
If internal coverings are removed the live current parts are exposed.

Guidelines for mounting / installation

- the MotorController should be mounted on the wall in such a way that there is free access for service inspections.
- adhere to the installation instructions and your local energy providers.
- select the place of installation such that free access is guaranteed for maintenance purposes.
- select cables according to regulations in this instruction - take the calculation of the actuators supply cable lengths into account when laying the cables.
- connect the cables in accordance with the drawings provided by the manufacturer.
- route the cables in the building according to the regulations in this instruction.
- check all system functions.

7 Cable dimensioning

Cables should be routed in compliance with applicable regulations.

7.1 Max. cable length

The maximum permitted cable lengths from the MotorController to the actuators, taking into account the cable cross-section, are shown in the following table.

7.1.1 Formula for calculating max. actuator cable length

$$\text{Max. cable length} = \frac{\text{permitted voltage drop 2V } \mathbf{(UL)} \text{ x copper's conductivity } \mathbf{(56)} \text{ x cable cross-section in mm}^2 \text{ (}\mathbf{a}\text{)}}{\text{Max. total actuator current per motor line in amperes } \mathbf{(I) \times 2}}$$

For ±24V standard actuators, the cable cross-section may not be less than AWG 18 (0.82 mm^2), irrespective of the result of the above formula.

Maximum actuator cable length: Always measured from the MotorController to the last junction box + actuator cable
Permissible max. voltage drop in the line: 2 Volt
Total actuator current: The sum of all the connected actuators max. current consumption per motor line
Note: do not use the PE wire / green/yellow wire in the actuator cable!

Example
Max. actuator cable length with cable cross-section of AWG 18 (0.82mm^2) and 2A current consumption: (2 x 56 x 0.82) : (2 x 2) = 23m (76ft)

7.1.2 Max. cable length – ±24V standard actuators

The actuator cable must have 2 wires minimum.

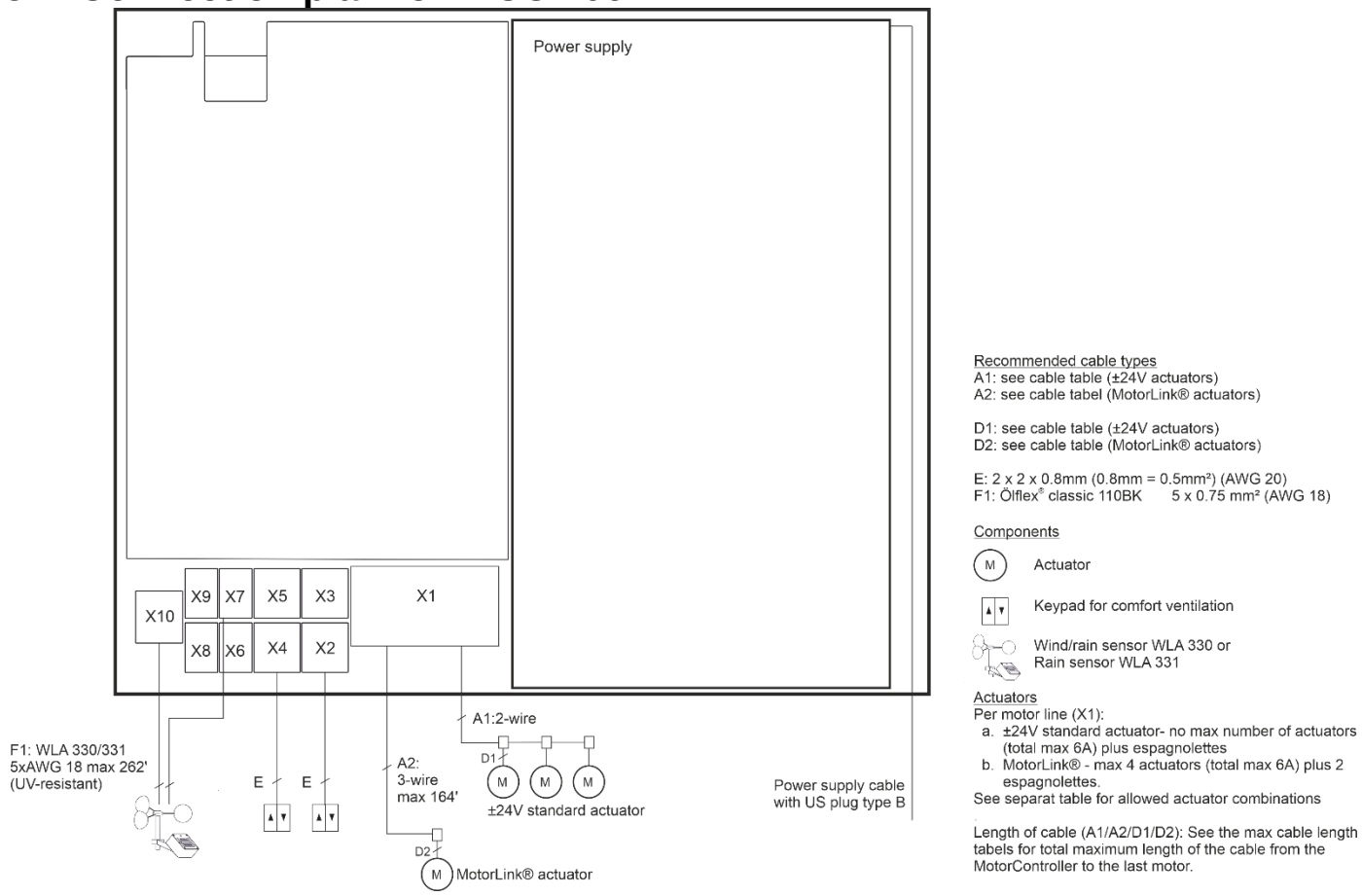
±24V standard actuators				
The PE wire/the green-yellow earth wire must not be used				
Cable-cross-section [a] / Total actuator current [I]	AWG 18 (3-wire 0.82mm²)	AWG 16 (3-wire 1.31mm²)	AWG 14 (3-wire 2.08mm²)	AWG 12 (3-wire 3.31mm²)
1A	151ft	240ft	382ft	608ft
2A	76ft	120ft	191ft	304ft
3A	50ft	80ft	127ft	203ft
4A	38ft	60ft	96ft	152ft
5A	30ft	48ft	76ft	122ft
6A	25ft	40ft	64ft	101ft

7.1.3 Max cable length – actuators with MotorLink®

When using actuators with MotorLink® the max cable length is 164ft regardless of the result of the above mentioned formula.

Actuators with MotorLink®				
The PE wire/the green-yellow earth wire must not be used				
Cable-cross-section [a] / Total actuator current [I]	AWG 18 (3-wire 0.82mm²)	AWG 16 (3-wire 1.31mm²)	AWG 14 (3-wire 2.08mm²)	AWG 12 (3-wire 3.31mm²)
1A	151ft	164ft		
2A	76ft	120ft	164ft	
3A	50ft	80ft	127ft	164ft
4A	38ft	60ft	96ft	152ft
5A	30ft	48ft	76ft	122ft
6A	25ft	40ft	64ft	101ft

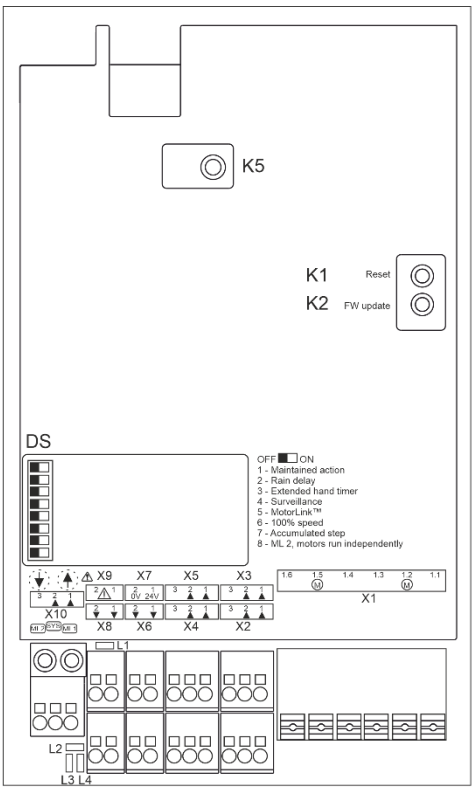
8 Connection plan for WCC 106



The above connection plan shows a WCC 106 MotorController

9 Connection description

On the WCC 106 the following can be connected: ±24V standard actuators, MotorLink® actuators, comfort keypad, thermostat and similar plus wind / rain sensor.



X1 1.1 24V / 0V, 1.2 MotorLink®, 1.3 0V / 24V } Motor line #1
1.4 24V / 0V, 1.5 MotorLink®, 1.6 0V / 24V } Motor line #2

X2 2.1 Open, 2.2 Close, 2.3 GND / 0V } Comfort keypad #1

X3 3.1 Open, 3.2 Close, 3.3 GND / 0V } Automatic control #1

X4 4.1 Open, 4.2 Close, 4.3 GND / 0V } Comfort keypad #2

X5 5.1 Open, 5.2 Close, 5.3 GND / 0V } Automatic control #2

X6 6.1 Output #1, 6.2 Output #1 } Status (open)

X7 7.1 24V, 7.2 0V } AUX, power supply for external sensor

X8 8.1 Output #2, 8.2 Output #2 } Status (open)

X9 9.1 Fault, 9.2 Fault } Output

X10 10.1 Common open, 10.2 Common close (Rain), 10.3 GND / 0V } Common / Weather station

DS DIP switch 1-8

↓ ↑ Close and open all windows

K1 Reset

K2 Firmware update

K5 No function on this version

L1 LED 1 - Sum error

L2 LED 2 - System status

L3 LED 3 - Motorline #2 status

L4 LED 4 - Motorline #1 status

X1

WCC 106 contains two motor lines to which ±24V standard actuators or MotorLink® actuators can be connected. The two motor lines must run with the same type of actuators, meaning either ±24V standard actuators or MotorLink® actuators. When running MotorLink® actuators, DIP switch #5 must be set, see chapter about DIP swithes for details.

<u>±24V standard actuators</u>

Data:

1.1 24V / 0V
1.2
1.3 0V / 24V } motor line #1

1.4 24V / 0V
1.5
1.6 0V / 24V } motor line #2

<u>MotorLink® actuators</u>

Data:

1.1 0V
1.2 Communication
1.3 24V } motor line #1

1.4 0V
1.5 Communication
1.6 24V } motorline #2

The number of permitted actuators on the motor line depends on the actuator type. The total current consumption connected to the motor line may not exceed 4A and the total current consumption for both motor lines may not exceed 6A incl. load on X7 (AUX). In addition to the actuators, locking actuators of type WMB 8xx

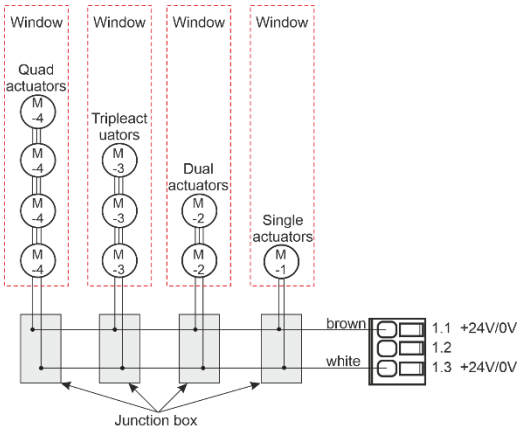
may also be connected. The locking actuators' power consumption is not included in the calculated 6A as the actuators and locking actuators do not run simultaneously.

All actuators on the same motor line run/are operated at the same time.
All actuators on a motor line must be the same type.

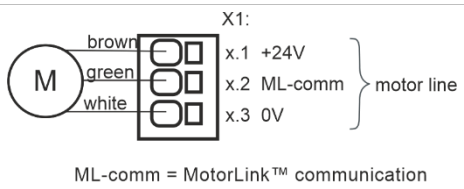
Connection / cable diameter: flexible max AWG 10 / solid max AWG 8.
Cable length: see the chapter "Cable dimensioning".

Standard ±24V actuators
Example with max. 3A current consumption
a) 3 pcs. WMX 826-1
b) 2 sets of 3 pcs. WMX 504-3
c) 1 pc. WMU 883-1
d) 2 pcs. WMU 861-2

Connecting variants to standard actuators on motor line 1



MotorLink® actuators
Examples with actuators per motor line
Ex. 1: 4 pcs. WMX 823-1
Ex. 2: 2 pcs. WMX 836-2
Ex. 3: 3 pcs. WMU 826-3



ML-comm = MotorLink™ communication

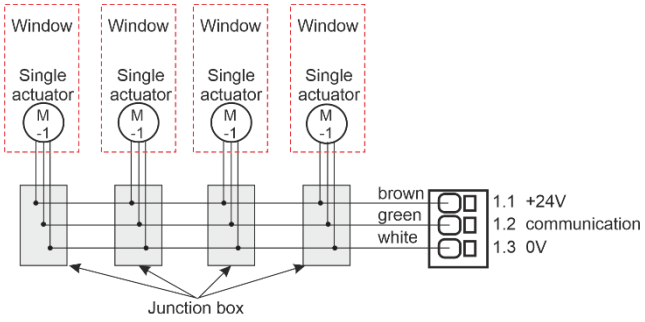
Allowed actuator combinations on a MotorLink® motor line
The two motor lines can each be connected to one of the below shown combinations.

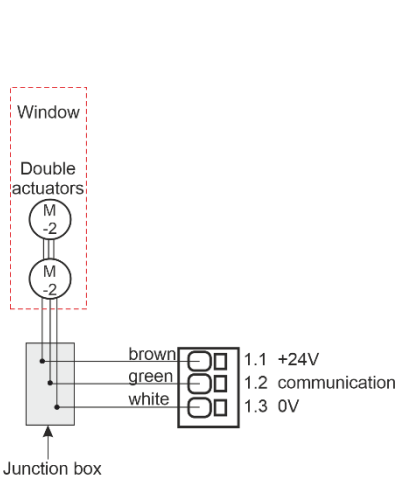
-1 (single): one window with one single window actuator. Up to four windows each with one single window actuator can be connected

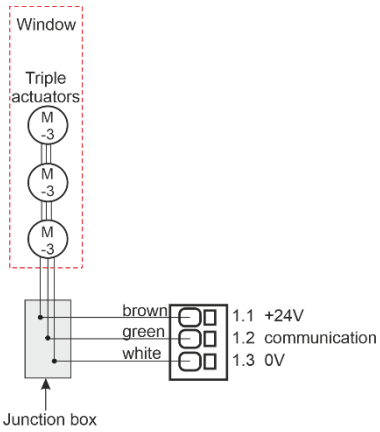
-2 (double): one window with two double window actuators.

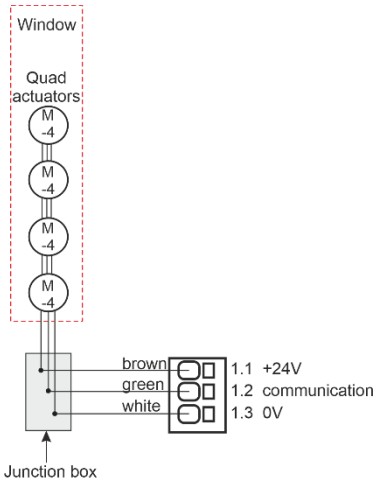
-3 (triple): one window with three triple window actuators.

-4 (quad): one window with four quad window actuators.







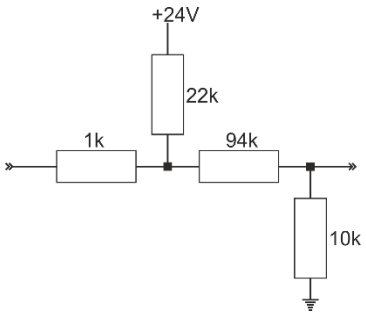


X2 / X4

Input for connection of comfort keypad

Motor line 1:	Motor line 2:
Data:	Data:
2.1 Open	4.1 Open
2.2 Close	4.2 Close
2.3 GND / 0V	4.3 GND / 0V

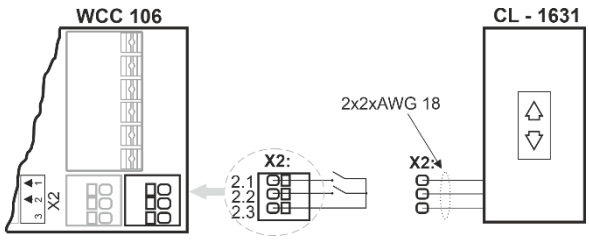
Input circuit (simplified)



With the factory-set values the input is:
"Active" if resistor is less than 5kΩ
"Inactive" if resistor is greater than 8kΩ.

Input has pull-up current of approx. 1mA (min. 0.9mA, max. 1.1mA) if input short-circuits.

Example: Comfort keypad connected to input X2



X3 / X5

Input for automatic control.

Motor line 1:	Motor line 2:
Data:	Data:
3.1 Open	5.1 Open
3.2 Close	5.2 Close
3.3 GND / 0V	5.3 GND / 0V

X3 and X5 must be controlled by potential/volt free contact.

X3 and X5 have lower priority than X2 and X4 respectively.
X3 and X5 are blocked for 30 minutes after X2 and X4 respectively has received a command.

X6 / X8

Motor line status (open) possibility to connect to BMS

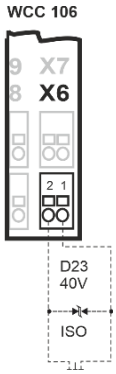
Solid state relay output. Ouput is off (infinite resistance) when windows are assumed closed.

Motor line 1:	Motor line 2:
Data:	Data:
6.1 Output	8.1 Output
6.2 Output	8.2 Output

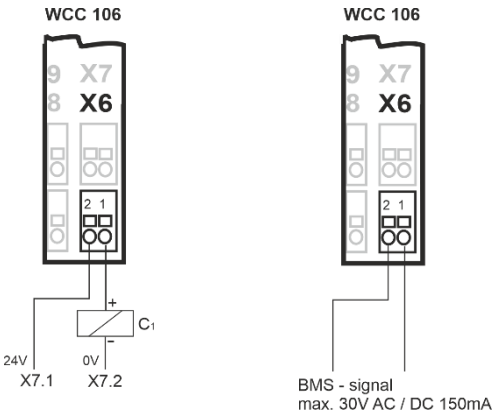
Solid state output for signal transmission.

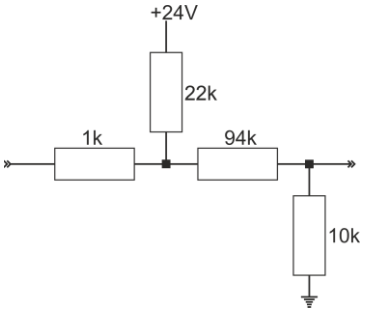
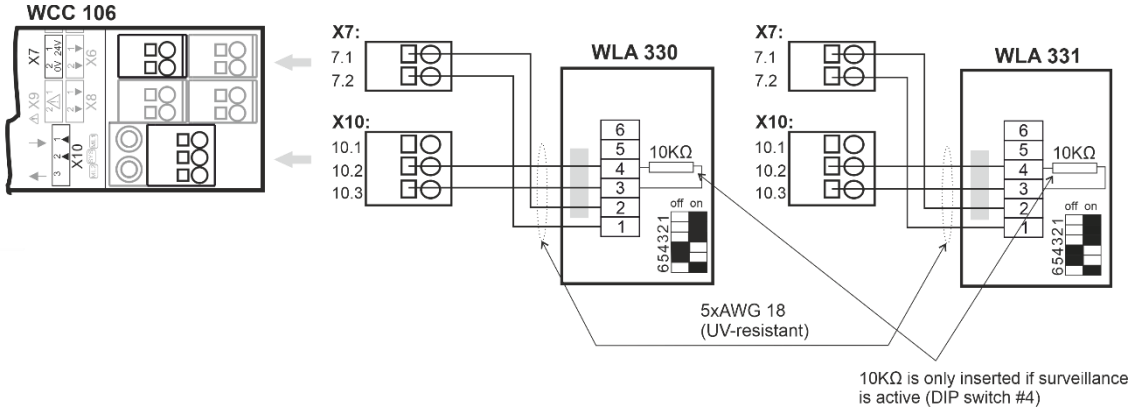
Data
Max. voltage: 30 Vp (peak)
Max. current: 150 mA
Typical On-resistor: 15Ω
Max. On- resistor: 18 Ω
Max. Switching speed: 2 ms

Output circuit (simplified)



Example with solid state and relay (polarization is not important)



X7	AUX, power supply for weather station, for example. See “X10” for a description of connection of rain/wind sensors. Data: 7.1 24V 7.2 0V Maximum 500 mA Main power must be switched off, before connecting any kind of external equipment to X7! Connected consumption must be included in the controller’s total load, which must not exceed 6A.
X9	Solid state output, for transmission of fault signal Data: 9.1 Fault – Open contact = Fault, Closed contact = OK 9.2 Fault – Open contact = Fault, Closed contact = OK Data Max. voltage: 30 Vp (peak) Max. current: 150 mA Typical On-modstand: 15Ω Max. On-resistance: 18 Ω Max. switching speed: 2 ms
X10	Connecting wind / rain sensors of type WLA 330 or WLA 331. Wind / rain sensor must be connected on both X10 and X7. Data: 10.1 Common Open 10.2 Common Close (Rain) 10.3 GND / 0V X10 has highest priority over X2/X4 and X3/X5. With the factory-set values the input is: “Active” if resistor is less than 5kΩ “Inactive” if resistor is greater than 8kΩ. Input has pull-up of approx. 1mA (min. 0.9mA, max. 1.1mA) Input circuit (simplified)  **Connecting wind/rain and rain sensor** WLA 330 and WLA 331– the sensors settings are set on the sensor.  DIP switches 1-3 on WLA 330 must be set in relation to windspeed tolerances. See the guideline for WLA 330 for DIP switch settings.
DS	DIP switch block with 8 DIP switches. 1 Maintained action 2 Rain delay 3 Extended hand timer 4 Surveillance 5 MotorLink® 6 100% speed 7 Accumulated step 8 Motor line 2, motors run independently Factory setting = OFF See chapter “DIP switch configuration” for detail information.
↓ ↑	Close / Open all windows

K1	Reset
K2	FW update; to be used in line with firmware updates
K5	No function on this product version
LED 1	Yellow LED that indicates error on the MotorController. As a reference to fault output X9. If the diode is off, there is no error/failure. Output X9 is OFF. See chapter, “Status and troubleshooting via LED on the MotorController” for more information.
LED 2	Green LED that shows status of MotorController. If diode lights constantly, there is no error/failure. If the diode blinks, see chapter, “Status and troubleshooting via LED on the MotorController” for more information.
LED 3	Green LED that shows status of the motor line 2. The diode can light constantly or blink asynchronously. See chapter, “Status and troubleshooting via LED on the MotorController” for more information.
LED 4	Green LED that shows status of the motor line 1. The diode can light constantly or blink asynchronously. See chapter, “Status and troubleshooting via LED on the MotorController” for more information.

10 DIP switch configuration

The MotorController has 8 DIP switches for easy configuration. The factory setting for the DIP switches is OFF.

DIP switch	Description on the MotorControlleren	DIP switch position
1	Maintained action	**ON:** the actuators open/close completely when the comfort keypad is pressed. **OFF:** the actuators run for as long as the comfort keypad is being pressed.
2	Rain delay	**ON:** the rain signal must be active min. 60 sec. before the actuators begin to close. **OFF:** the actuators begin to close as soon as the rain signal is activated.
3	Extended hand timer	**ON:** after manuel override the actuators are locked for 2 hours (except rain/safety signals). **OFF:** after manuel override the actuators are locked for 30min (except rain/safety signals).
4	Surveillance	**ON:** activate cable survaillance on input X10.1 (rain). The Input must be terminated with 10k resistor. **OFF:** no cable surveillance.
5	MotorLink®	**ON:** MotorLink® motors are connected to the MotorController. It might be necessary to reset the MotorController when activating this DIP switch. **OFF:** ±24V standard motors are connected to the MotorController.
6	100% speed	**ON:** actuators run with 100% speed, when run manually. **OFF:** actuators run with 75% speed, when run manually.
7	Accumulated step	**ON:** actuators open/close in steps, when a thermostat e.g. WLA 110 is connected to the MotorController and the setpoint ist exceeded. Opening step: 5% for every 5min Closing step: 10% for every 10min **OFF:** actuators open/close completely when a thermostat e.g. WLA 110 is connected to the MotorController and the setpoint is exceeded
8	ML 2, motors run independently	**ON:** the actuators on motor line 2 are controlled individually via input X2, X3, X4 and X5. Up to 4 actuators can be connected to motor line 2 and all actuators must be single / -1 actuators. The actuator’s serial number determines, which input controls which actuator, the serial number is automatically identified by the firmware in the MotorController. X2 – controls the actuator with the highest serial number X3 – controls the actuator with the second-highest serial number X4 – controls the actuator with the second-lowest serial number X5 – controls the actuator with the lowest serial number The actuators can be identified by activating the different inputs. The serial number can also be read on the product label on the actuator. Actuators on motor line 1 are controlled together via input X10. Up to 4 actuators can be connected to motor line 1. All actuators on motor line 1 must be of the same type, incl. team size and chain length. The actuators must be either single /-1 or quad /-4. All connected actuators on both motor lines must be MotorLink® actuators and DIP switch #5 must also be set to ON. **OFF:** 2 Motor groups with a motor line each

11 Status and troubleshooting via LED on the MotorController

In the event of failure/error of the MotorController one or more diodes will light and/or blink.
On the WCC 106 there are 4 diodes - 3 green and 1 yellow - that can indicate errors and status on the MotorController.

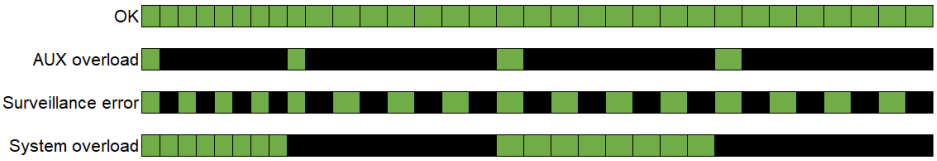
Irrespective which diode lights or blinks, the indicator is based on a 3.2 second sequence that is repeated continuously. Each sequence is defined by 32 x 0.1 second time segments.

If there are several errors on the MotorController simultaneously they are displayed by priority, i.e. error messages for the most critical failures are shown first and repeated until the failure is remedied. Then error number two is shown, which likewise is repeated until the error is remedied etc. The following overview shows the most frequently occurring errors, if an error other than those listed below is indicated, contact WindowMaster.

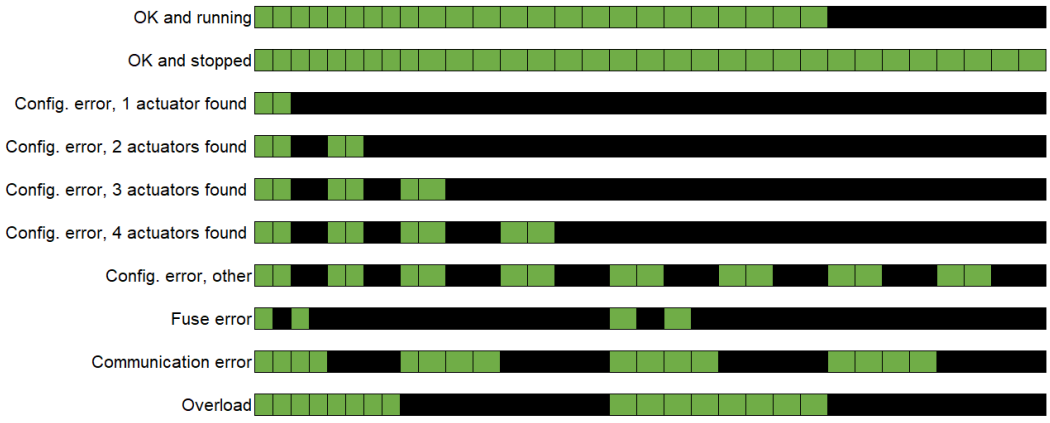
Yellow diode – LED 1
If the yellow diode lights, this indicates an error on the MotorController.
Black = diode off

Error indicator on the yellow diode is a total errors indicator. Detailed information on the error type can be decoded on the green diode.

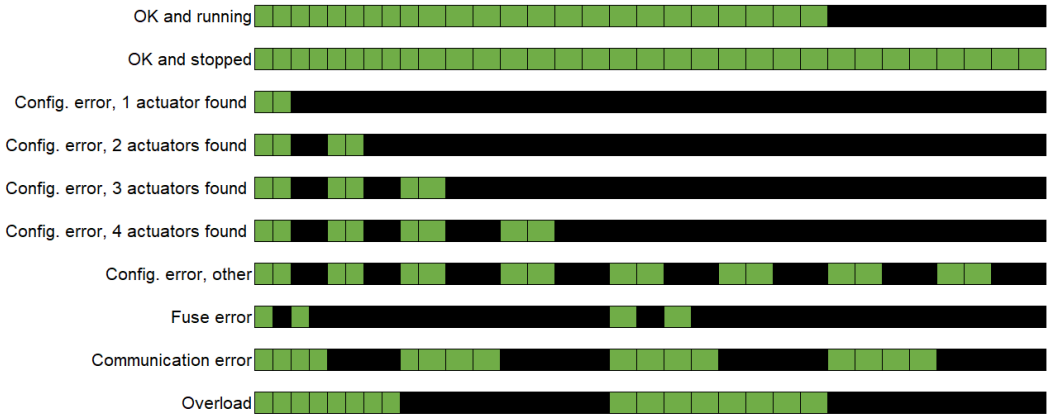
Green diode – LED 2
If the green diode LED 2 (closest to X10) blinks, this indicates the error on the MotorController.
Black = diode off



Green diode – LED 3
The green diode LED 3 (furthest away from X8) indicates status of or error on the motor line #2.
Black = diode off



Green diode – LED 4
The green diode LED 4 (closest to X8) indicates status of or error on the motor line #1.
Black = diode off



12 Commissioning and test run

In the event of error messages, refer to chapter “Status and troubleshooting via LED on the MotorController”.

12.1 MotorController fully installed, without operating power

1. Check all mechanical and electrical components for damage.
2. Check all screw and plug connections for tightness and/or firm seating.
3. Check that all external components are installed; check polarity for the ±24V actuators

12.2 With network power

Adhere to the relevant regulations!
Connect the mains cables and reapply the mains voltage.

12.3 Comfort keypad

Look closely at the actuators as they open and close - there must not be any obstacles in any position and the actuator connection wires must not be overstrained with pulling or pinching.
Test every single comfort keypad.

12.4 Wind/rain sensor

1. Open the actuators with the comfort keypads.
2. Dampen the rain sensor, the actuators close completely.
3. While the actuators are running, press Open button on the comfort keypad. The actuators must neither open nor stop.

If commissioning proceeds correctly, the lid of the MotorController may be fitted.

If commissioning does not proceed correctly, i.e. there is an error in one of the test points, refer to chapter “Connection description”
If necessary, re-test the cable routing in accordance with chapter “Connection plan for WCC 106”.

13 Maintenance

Control and maintenance should only be done by the manufacturer or an authorized partner.

Remove all soiling from the MotorController. Check fastening and clamping screws for firm seating.
Carry out a test run of the entire system (see chapter 19 ‘Commissioning and test run).
Only have defective units repaired in our factory. Only install original spare parts.

The expected minimum lifetime for the MotorController is 10 years.