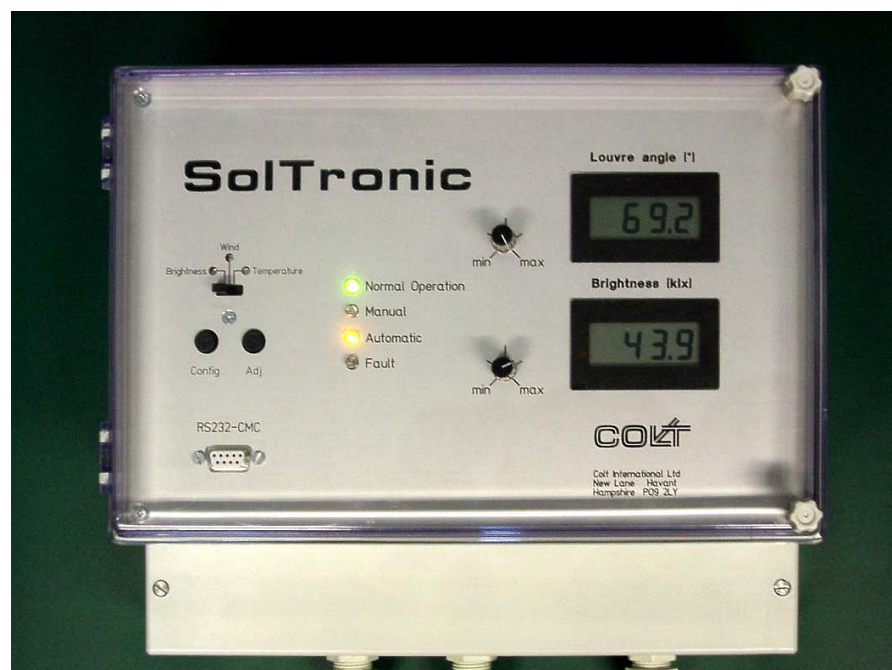


SolTronic

General Guide

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1.0 WHAT IS SOLTRONIC?

1.1 General description

Soltronic is Colt's intelligent solar shading control system. It is suited to smaller applications, and provides sun tracking control for louvre systems. Louvres can be installed on the façade, on the roof, or even within the building.

As the smaller brother of CCS 2000, Soltronic incorporates many of the key features of CCS. The brain of the system consists principally of a weather station and a microprocessor control module. This module calculates the instantaneous position of the sun for a given building location and a given façade/ roof azimuth, and adjusts the louvres accordingly.

Soltronic may be programmed to respond to timers and sensors:

- For time switching, shading can be programmed to operate only at set times, for instance to provide a night time position so as to limit heat loss from the building, or to permit night cooling by opening ventilators. Such control routines ensure that the system reacts appropriately to the sun's angle for the specific time of the year.
- Sunlight sensing move the louvres move to sun tracking mode when the sun is shining, but when it is cloudy they then move to a pre-set position that optimises daylight entry.
- Temperature sensing can determine the optimum control regime for the day, where shading is used to control overheating.
- Wind sensing can move an external system to a safety position on windy days. Frost sensing can inhibit the movement of devices.
- Local manual and cleaning overrides are available.

Parameters (e.g. building location, façade azimuth) are set by connecting Soltronic to a PC via its serial port.

There is the option to fit Soltronic with a Colt Modem Control (CMC) function for remote diagnostics and control.

1.2 Essential features of Soltronic

- Soltronic controls **a maximum of 4 actuators within a control device group** on a timed basis for opening angles of between 0° and 90°.
- An automatic reference (calibration) run is carried out to check the run time, using the actuator's integral limit switches.

The reference run occurs:

- When powering up Soltronic
- at 0600 on the first day of the month

Reference run:	<p><u>Stage 1</u> CLOSED until hits the CLOSE limit switch (datum point)</p> <p><u>Stage 2</u> OPEN until hits the OPEN limit switch (measures the time to open)</p> <p><u>Stage 3</u> CLOSED until hits the CLOSE limit switch (measures the time to close)</p>
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If the limit switch is damaged or positioned incorrectly, once the run time has exceeded 90 seconds, Soltronic will throw up an error message.

1.2 Essential features of Soltronic continued

- A reference (calibration) run is carried out to ensure that the louvres are positioned correctly. The closed position is the reference position. This takes place when
 - Soltronic moves from day to night mode
 - Soltronic ends manual override mode
- Soltronic ensures that the duty cycle is not exceeded (actuators are permitted to run at > 30% of the time), whilst in automatic mode.
- Soltronic permits manual control of actuators by switching (e.g. room controls). If no switching occurs within 90 minutes, then Soltronic returns to automatic mode.
NOTE: In manual control there is no check that the duty cycle is not exceeded.
Manual mode is switched off if two buttons are pressed simultaneously.
- Soltronic automatically switches between day and night mode, following a calculation of the sun's shadow angle.
 - Night mode is when the sun is going down (shadow angle is 0°).
 - Day mode is when the sun is rising.

In day mode the angle of the louvres is set as follows.

- Their position is set by calculation of the sun's position, when the measured brightness is more than the brightness set point (15 kLux) and the sun is shining
- They move to the overcast position (usually 90° as the max. open position) when the measured brightness is less than the brightness set point (15 kLux) for 10 minutes or when the sun is not shining.

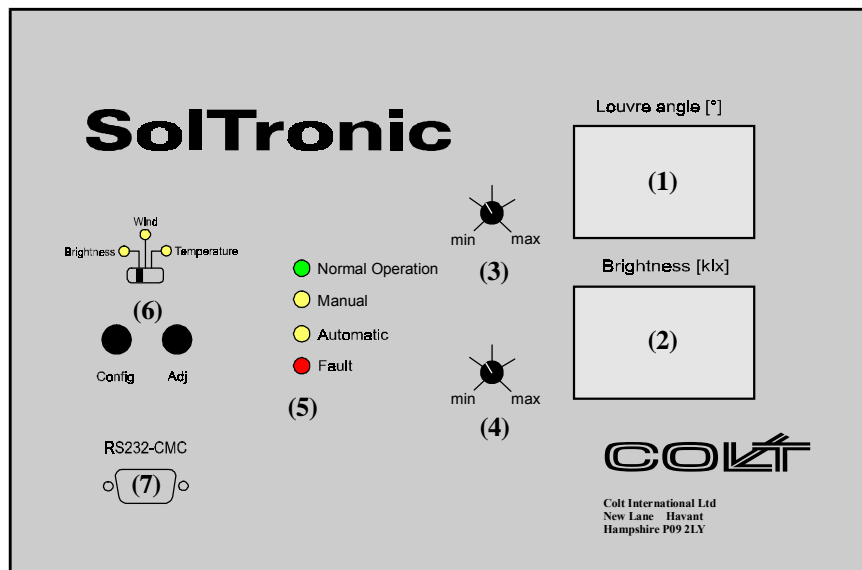
Both the brightness set point and the overcast position set points can be altered (see page 5).

- Soltronic calculates inputs from wind, rain and external temperature (optional) to prevent the louvres being damaged in by storm or ice.
In such conditions the louvres are moved to pre-set mandatory positions as follows:
 - Priority 1: storm position (45°), when wind velocity exceeds the wind velocity set point.
 - Priority 2: low temperature position (15°), when external temperature < external temperature set point and it is raining.
 - Priority 3: overcast position, night position and sun angle position.

All parameters can be altered (see page 5).

- Soltronic provides indication of status and values as described in the next section.

2.0 INDICATORS AND CONTROLS



- (1) Louvre angle display
Shows the louvre angle (either a calculated or mandatory position). Soltronic moves the louvres as soon as their required angle is more than 3.0° different to the previous command.
In configuration mode (see next page), this LCD displays the overcast, storm or ice position set points.
- (2) Brightness display
Shows the brightness in kLux as measured by the brightness sensor.
In configuration mode (see page 6), this LCD displays the brightness, wind or temperature position set points.
- (3) Potentiometer for setting the position of louvres in overcast and mandatory positions
In configuration mode (see page 6), this knob sets the louvre position (0° to 90°).
- (4) Potentiometer for setting the set points for overcast and mandatory positions
In configuration mode (see page 6), this knob allows the adjustment of set points:

Brightness set point	->	from 0 kLux to 60 kLux
Wind set point	->	from 0 m/s to 35 m/s
External temperature set point	->	from 0°C to 10°C
- (5) LED normal operation/fault and manual/automatic

NORMAL OPERATION shows when Soltronic is functioning normally.

FAULT shows in one of the following circumstances:

<u>Fault</u>	<u>Remedy</u>
- Control module power failure	-> Requires a service call
- Watchdog function operating	-> Switch off the mains supply for at least 5 seconds before switching on again. If fault persists, a service call is necessary.

2.0 INDICATORS AND CONTROLS continued

MANUAL shows when Soltronic is in manual mode.

AUTOMATIC shows when Soltronic is in automatic mode.

If any of these LEDs are flashing, then Soltronic is in the course of carrying out a reference / calibration run, or to protection the actuator (e.g. duty cycle exceeded), or the louvres have been moved to a mandatory position. Wait until the flashing stops.

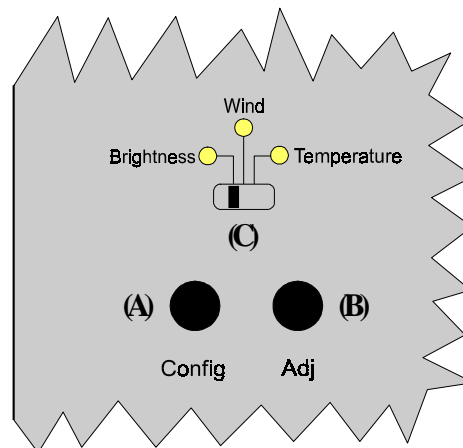
(6) Switches and buttons

See page 6.

(7) RS232-CMC

Serial port for qualified Colt personnel.

3.0 Configuration of parameters



(A) Config. button activates configuration mode

So long as this button is held down, the panel remains in configuration mode. However the configuration mode is not possible so long as the panel is not carrying out a reference (calibration) run, switching from one mode to another, or carrying out a command. Once the panel is in configuration mode, the automatic solar shading routines are de-activated. Important: Do not press this key if the panel is in the course of doing a reference (calibration) run, since this can lead to a system error.

(B) Adjust button permits changes to be made

So long as this button is held down, the parameters relating to potentiometers (3) and (4) (see page 4) can be altered (see (C) below). Release this button, followed by button (A), then the parameters are saved. If no changes are required, then release button (A) before button (B).

(C) Sliding switch permits selection of the parameter to be changed

This switch defines which parameter is to be altered:

Brightness	->	LCDs show louvres overcast position* (upper LCD) and overcast position set point (lower LCD)
Wind	->	LCDs show louvres storm setting (upper LCD) and storm setting set point (lower LCD)
Temperature	->	LCDs show louvres ice position (upper LCD) and external temperature set point (lower LCD)

The LEDs show which parameter is being viewed.

* i.e. the position to which the louvres will move when it is windy.

Example: Altering the *Wind* parameter

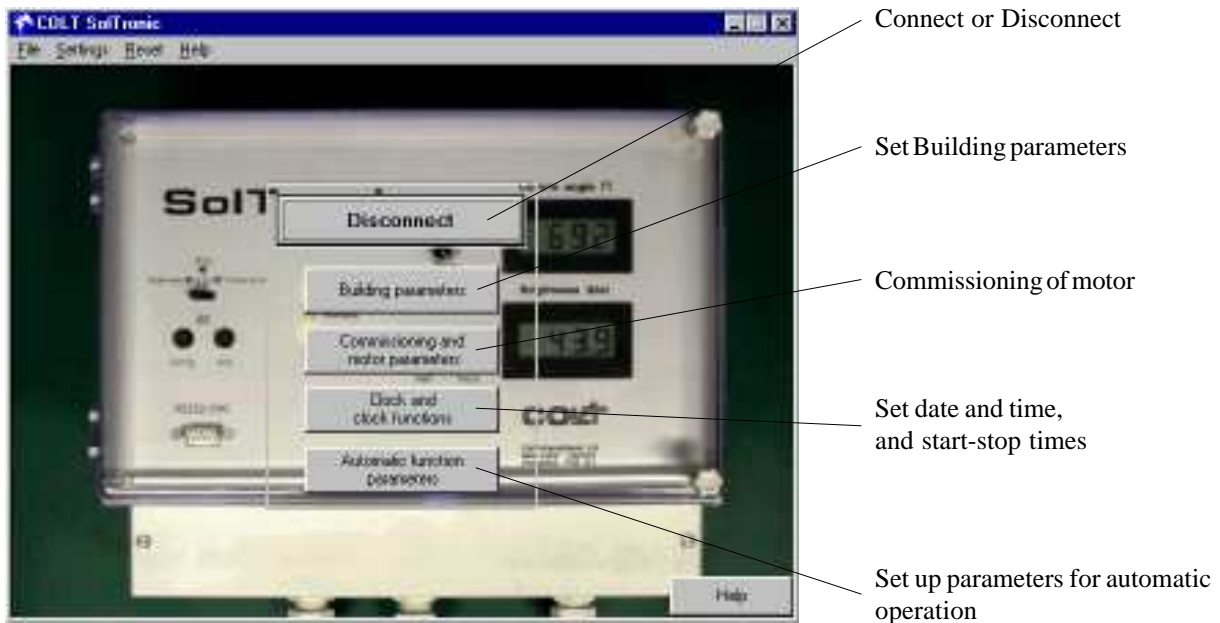
- 1.) Press and hold down the config. button.
- 2.) Move sliding switch to *Wind*.
- 3.) Press and hold down the adjust button.
- 4.) Turn the upper potentiometer to the required louvre position (look at upper LCD).
- 5.) Turn the lower potentiometer to the required set point (look at lower LCD).
- 6.) Release the adjust button, then
- 7.) Release the config. button

4.0 Technical Data

Max. power consumption:	5A at 230V/50Hz		
Motor connections:	max. 4x 1A at 230V/50Hz		
Sensors:	Brightness	0 to 10V	(0 to 100 kLux)
	Ext. temperature	4 to 20mA	(-30 to + 60°C)
	Wind speed	4 to 20mA	(0 to 50m/s)
Operating temperature:	0 to 40°C		
Protection class:	IP54		
For installation in:	Dry, closed internal space		
Dimensions:	W x H x D 300 x 200 x 150mm		

4.1 Commissioning

SolTronic has to be commissioned using a PC (Laptop/Notebook) and accompanying CD.
 The building-specific data is needed, as well as its longitude and latitude.
 Link SolTronic (RS232) with its serial cable to the PC (COM Port).
 Once the CD has been inserted the commissioning software starts automatically.
 Follow the instructions on the screen.
 Start view:

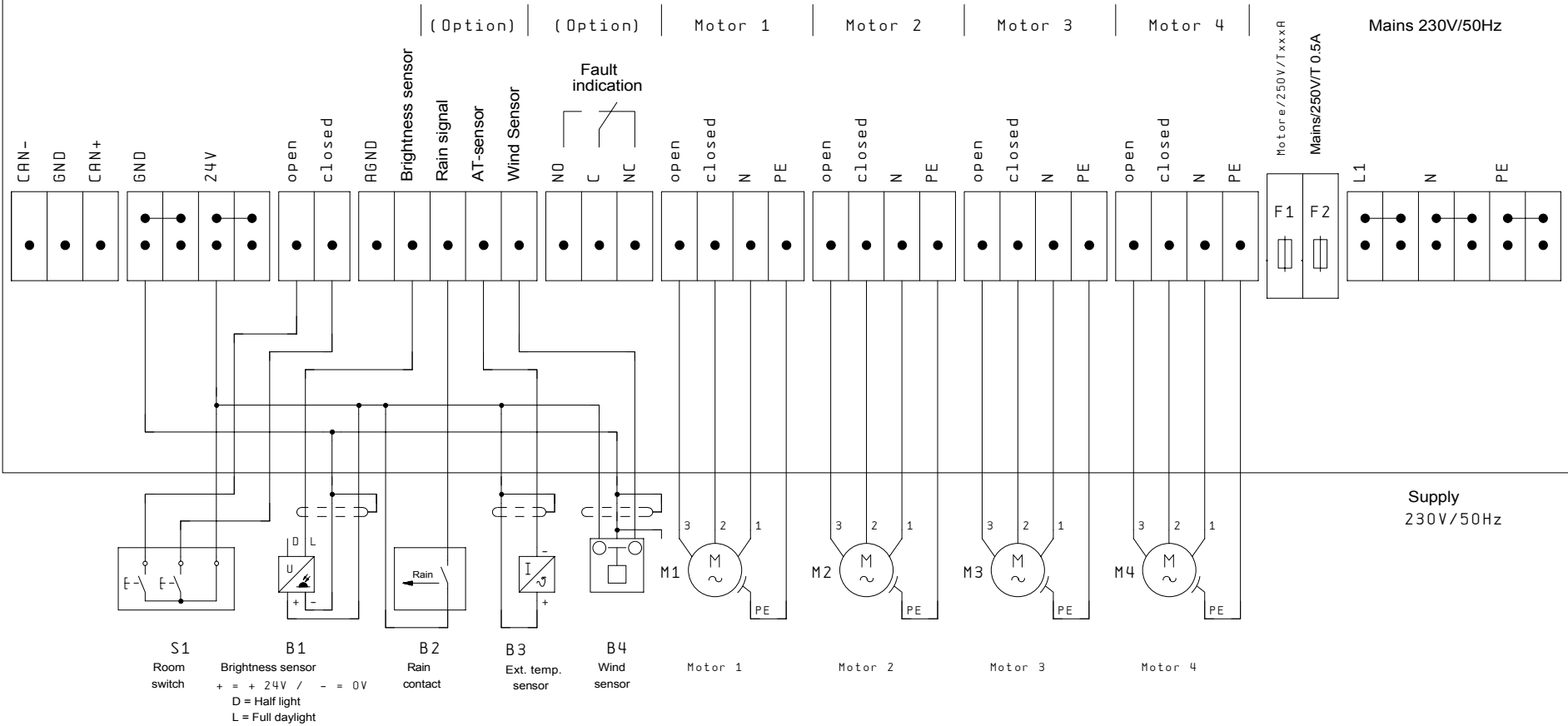


Take care to connect actuators correctly. Overcurrent protection devices can be supplied, this depends on the local / project requirements

Dims:300x200x150mm, plastic case
Transparent front window opening outwards from LHS

SolTronic

F1 = Overcurr. protection ratings:		
M	Piccolo/PIA	Econom
1	0,63	1,00
2	1,25	2,00
3	1,8	3,15
4	2,50	4,00



Note: Take care that before power is switched on, the rotation angle and stroke of the actuator has been checked, since an automatic reference run will take place.

Change	Name	Date
A		02. Jul. 2003
B		drawn LFR
C		checked
		norm

Connection Diagram



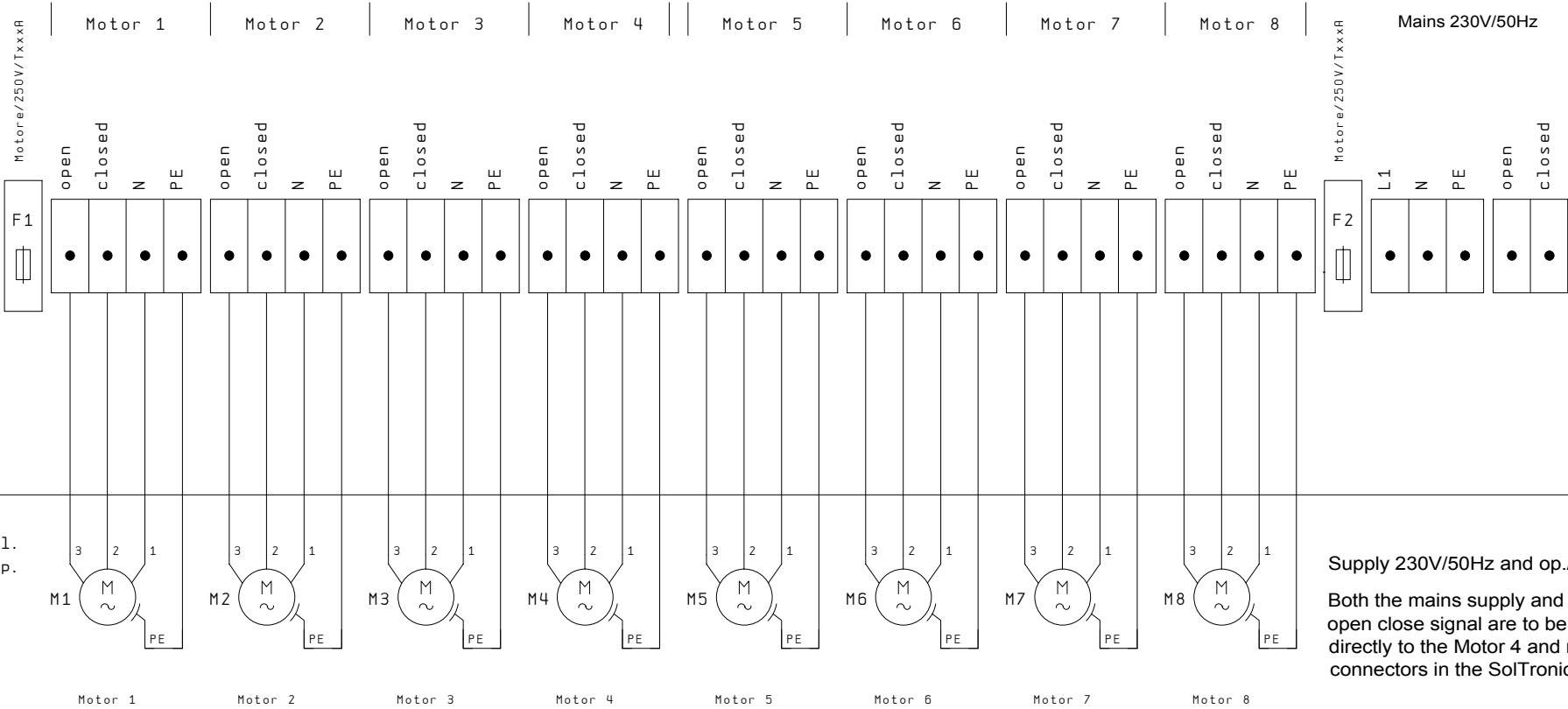
Take care to connect actuators correctly. Overcurrent protection devices can be supplied, this depends on the local / project requirements

F1 = Overcurr. protection ratings:		
M	Piccolo/PIR	Econom
1	0,63	1,00
2	1,25	2,00
3	1,8	3,15
4	2,50	4,00

Relay box

Dims:300x200x150mm, plastic case
Transparent front window opening outwards from LHS

F2 = Overcurr. protection ratings:		
M	Piccolo/PIR	Econom
5	0,63	1,00
6	1,25	2,00
7	1,8	3,15
8	2,50	4,00



1 = N
2 = L/c1.
3 = L/op.
PE = PE

Supply 230V/50Hz and op./cl. signal
Both the mains supply and the open close signal are to be connected directly to the Motor 4 and mains connectors in the SolTronic panel!

Note: Take care that before power is switched on, the rotation angle and stroke of the actuator has been checked, since an automatic reference run will take place.