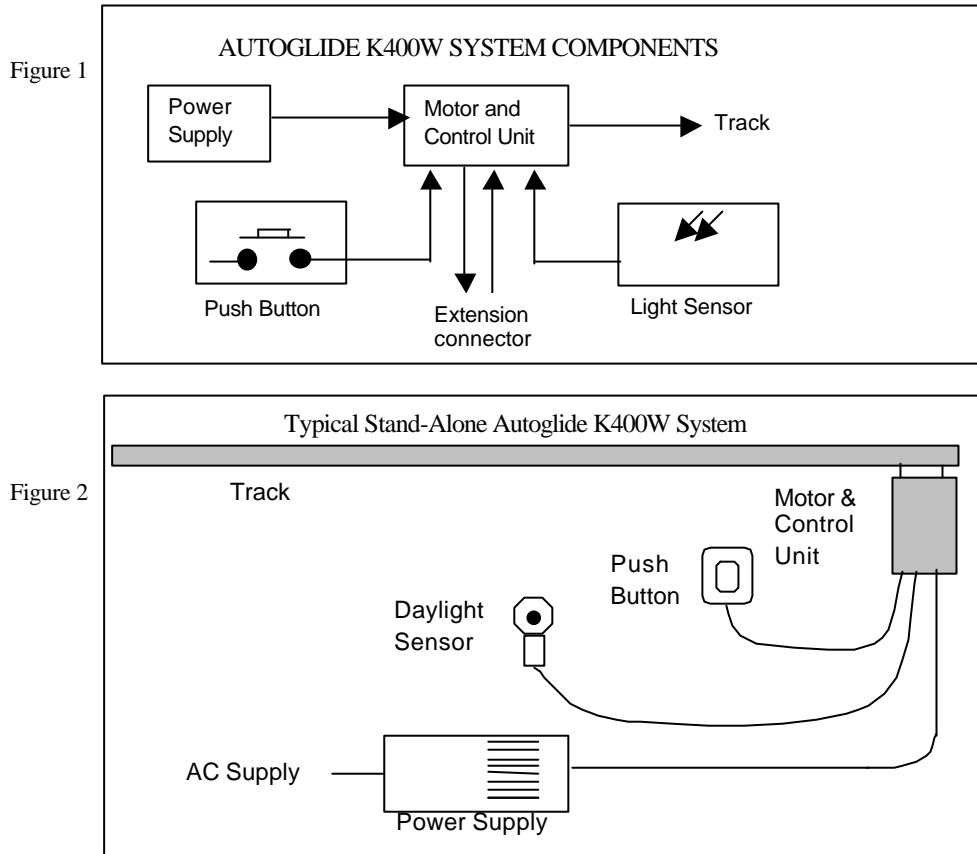# Swish Autoglide K400 Motor and Control Unit Interface and Control options

This file has been prepared to provide technical details of the interfacing options for the main control PCB of Swish Autoglide K400W. It is intended to assist users wishing to add remote or automatic control or to link two or more systems.

Autoglide K400W Interface Components

The Autoglide K400W System has two modular 4x4 way interface connectors mounted on the base of the combined motor and control unit. The motor and control unit contains all of the necessary electronic control circuits and in the standard configuration is driven by signals from a photo resistor daylight sensor, and sequential (close – stop – open – stop, etc) push button. Figure 1 shows a look diagram of the system components and Figure 2 a typical system layout. The power supply unit is a simple low voltage adapter containing a mains transformer, diode bridge, smoothing capacitor, and overload protection components. The track consists of mechanical parts only and is the same as that used by the K600W system.

Figure 1

AUTOGLIDE K400W SYSTEM COMPONENTS

Figure 2

Typical Stand-Alone Autoglide K400W System

Swish Autoglide K400W Control Description

Curtains can be opened and closed manually by push button control and automatically either by a daylight sensor or by timed on/off switching of the power supply. Units can be linked and controlled together.
The control circuit in the Motor and Control unit contains a custom micro controller and non-volatile memory and provides all of the supervisory and operating functions. These are:

- Manual push button sensing and operation
- Light sensing and operation, with adjustable sensing threshold
- Motor current sensing and over current protection
- Motor on/off and direction control
- Motor run time-out limit
- Power turnoff sensing and operation in opposite direction from last motor run
- Extension connector drive and sensing to allow multiple units to operate together
- Remote input/output control lines

Power to the motor is handled via a power transistor and a reversing relay. While the motor is running its current is monitored and cut off automatically if it rises above a fixed limit. This method is used to stop the motor at the end of the curtain's travel and also to allow the motor to be turned off if its rotation is impeded by faults such as excessive friction or jamming. An additional timeout arrangement stops the motor after approximately 30 seconds in any case to prevent continuous running in the event of a disconnected drive. All of the interface circuits run from an internally regulated and 'current-limited' 5-volt supply.

Swish Autoglide K400 Motor and Control Unit Interface and Control options

Control unit circuit and interface circuit description

All of the control unit circuits are contained on a single printed circuit board which is mounted along side the motor and gearbox. Interface connections are made to the two sockets SK2 and SK3. SK2 is the one nearer to the light sensitivity adjustment control. Pin 4 of each socket is a common 0 volt connection and all control inputs are made by common negative connections ('pull down' contacts, or 'NPN open collector' circuits). Pin 2 of each socket is for the connection of the push button manual control switch. This arrangement allows the control switch plug to be fitted to either socket and function identically. Diodes prevent the transfer of signals between SK1 and SK2 preventing interaction when several units are linked together.

The light sensor is to pin 3 of SK2. Light is sensed by a photo-resistor with a light response matching the human eye. Its resistance falls, as the light becomes brighter. Pin 1 of SK2 is linked to 0V by the light sensor plug to indicate to the controller that a light sensor has been connected. This prevents the controller from interpreting a disconnected light sensor as a 'dark' reading. A time delay of approximately 15 minutes is incorporated into the light sensing circuit to prevent false operation by shadows or flashing lights. It can be by-passed for setting up.

Figure 3
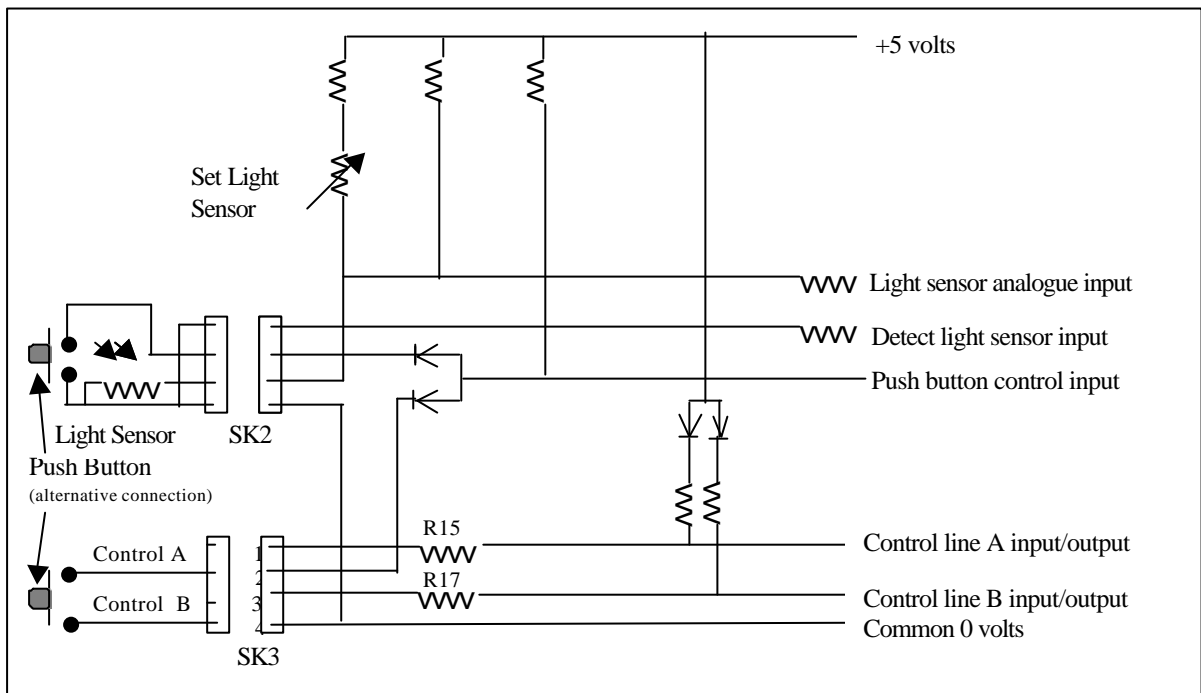
For simple timed operation an external mains plug-in timer can be used. Upon power-up, the control circuit runs the motor in the opposite direction from that of the previous power-up. This requires storage of the last operating condition in an EEPROM, which retains the information during the time that the power is removed. Upon power-up the circuit immediately checks for and gives priority to the light sensor inhibiting the automatic power switching control that would otherwise take place. This arrangement allows a combination of light sensing and power switching to be used without conflict so that for example the timer can be used to delay the opening of the curtains on bright mornings.

Control lines A and B allow signals to be transferred between units, allowing the interconnection of multiple units with a single timer and daylight sensor. Signalling between the units is via a "two wire common negative" system using "open collector" drivers and pull-up resistors. Diodes prevent a single unpowered unit from pulling down the signal lines, and resistors protect against short circuit faults. This simple intercommunication arrangement also allows direct operation by multiple push buttons and optional extended control 'home automation' applications. The operating login uses one control line for 'close' and the other for 'open'. Momentary operation of the close line whilst the system is running in the open direction will result in a 'stop' condition, maintaining the operation will result in a restart in the 'close' direction and vice versa. Operating the control lines simultaneously produces a 'stop' condition.

To allow 'single sided' operation – using one curtain across a single window or two separate units controlling one curtain track each across a wide window it is necessary to have the option to reverse the action of the light sensor. This is achieved by holding the push buttons down for 5 seconds or more whilst switching on the power to the circuit. This action stores a setting in the EEPROM. Repeating the action restores the original (default) value. To acknowledge that the circuit has responded the system will run in the new 'open' direction after the 5-second pause.