1.1 History and origin

Consumer interest in the integration of Shading systems (blinds etc) with electric motor drives is growing rapidly specially now there the choice of home automation systems and the number of home automation integrators grows.

The German manufacturer ELERO manufactured the worlds first tubular motor drive in 1964 and since that time the stopping limits & control components have changed little and accordingly the switching control requirements of these motors is a well established industry standard. Only in recent years have some motors for the industry used electronic limit controls that can utilize digital or other switching methods not adhering to the basic requirements.

Manufacturers of the electric motor drives have for many years stipulated the basic switching functions compatible with the general use motors on ALL their literature & instruction information.

BUT! as automation trend develops, the observance of these basic requirements seems to still confuse many in the automation industry. In recent years the ignoring of these basic switching functions has lead to damaged motor drives and unhappy customers. Therefore we set out in this presentation to demystify the nonnegotiable switching requirements for elero electric motor drives.

1.2 Applications and motor types

The below information applies for all standard elero motor drives mentioned in this table, but also can be applied to similar manufacturers product powered by 240 V AC (all of the below does not apply to DC motors).
Generally all motors with a capacitor and micro switch limit control are covered by this information.

Motor used in:	**Motor type description:**
Roller blinds	Tubular motor (elero type 8 and 9)
Holland Blinds	Tubular motor (elero type 8 and 9)
Roman Shades	Tubular motor (elero type 8 and 9), Square type motors (elero "JA" type)
Austrian Shades	Tubular motor (elero type 8 and 9), Square type motors (elero "JA" type)
Curtains	(elero does not manufacture this motor type, but is OEM control supplier for some companies)
Awnings	Tubular motor (elero type 8, 9, 10 and 11)
Folding Arm Awning	Tubular motor (elero type 9, 10 and 11)
Movable Dutch Canopies	Tubular motor (elero type 9), Square type motors (elero "JA" type)
Roller shutters	Tubular motor (elero type 8, 9, 10 and 11)
Rolling doors	Tubular motor (elero type 9, 10, 11 and 15)
Timber Venetian Blinds	Tubular motor (elero type 8), Square type motors (elero "JA" type)
Internal Venetian Blinds	Tubular motor (elero type 8), Square type motors (elero "JA" type)
External Venetian Blinds	Square type motors (elero "JA" type)
Louvres	Linear actuators, Square type motors (elero "JA" type)
Ventilation flaps	Linear actuators, Square type motors (elero "JA" type)
Solar panel alignment	Linear actuators, Square type motors (elero "JA" type)

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2.1 The basic requirements "The RULES"

1 No parallel connection of motors. Or, more simply, DO NOT connect 2 or more motors to a single switch function.
The capacitor between the up and down supply of one motor will cause a feedback to other motors connected in parallel.

2 A 500ms (0.5 sec.) break between switching motor drive directions is required. Preferably, up and down directions should be interlocked so power to up and down at the same time cannot occur
A switch device with a clear OFF position for 500ms is the minimum.

3 Connect motor drives with a 4 wire flexible cable. Mains power is switched between 2 wires, Brown & Black for direction. The Neutral wire is Blue and Earth is Green/Yellow. If the motor hum's without moving when powered up, the connections are incorrect.

FAILURE TO OBSERVE THESE RULES WILL VOID THE CUSTOMERS ELECTRIC MOTOR DRIVE WARRANTY!

2.2 Failure results

Today's motor drives are very robust and can tolerate damaging switching activity for some time.
During commissioning the integrator it is usually just checking: Motor runs up, motor runs down: All O.K.
However, unknowingly they are often slowly damaging the motor windings and within a few days to a few months the motor will fails if above rules are not observed.
As a responsible motor drive manufacturer, elero investigates all premature motor drive failures as the failure rate of total units manufactured is extremely low.
In most cases incompatible switch devices or functions are the cause of premature motor failure.

The major problem for the customer and the blind supplier is an eventual failure is relative to the number of instances the incorrect actions have been applied. Failure might happen "only" after 2 years, but can also happen just days after the installation. In the case of automation control it is usually sooner as the automation tends to apply a higher frequency of operation to the motor.

2.3 Standard Lifespan

A motor drive of this type connected correctly has a life span of many years in normal daily use which can vary greatly depending on how many times it has been operated.
I.e. - Crown Casino Melbourne, 400 remote automated blinds (1997)
- Siemens Head office Melbourne, 200 Sun and Wind automated external Venetians (1998)
- Security Commission Building Kuala Lumpur, Malaysia: 1600 roller blinds, timer and sun automated (1997)

Some of our motors are still in service after 30 years of operation!
(Arrange a visit with us in Germany and we can show you living proof)

2.4 Following "the rules"

The automation system supplier mostly is having switching hardware (interface) that can meet the 3 rules requirements only by software and extensive programming.
For many years before home automation was the trend, ELERO has manufactured the appropriate interface devices that meet ALL the rules by hardware and fixed IC programming.
Yet, still to often we see installations where integrators have not complied with the 3 basic rules that apply.

Using the automation system supplier interface & software at this point might create less hardware cost but generally you end up with a higher overall consumer cost due to more extensive programming requirements.
How to implement this programming for C-bus is described in:
http://www.cbusforums.com/forums/showthread.php?t=97
See post 29 and 30 of "Guru"

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2.4 Rules checklist

If you can answer all of the below questions with "YES" go ahead and control the motors directly by C-bus. However, if you have one or more "NO" answer, read on for some easier options.

- Are you able to program the motor drive requirements with the C-bus parts you are using?
- The motor drive requirements are still met at a system reset/ power outage?
- The requirements are still met if a user operates the relays manually?
- The motor drive requirements are still met if there are opposing signals at the same time? (i.e. Timer or sun sensor brings the blinds down, user sees this and keeps pressing the UP button)
- Is programming "secure" against anyone changing the settings at a later stage accidentally?
- To maintain easy upgrade of the system, can somebody else at a later stage easily add switches or switch points to control the motors without affecting the requirements?
- Are you able to test that the motor drive requirements are met?
- Can you ensure the motor drive requirements are met over the life of the motor/ C-bus system?
- Can you guarantee your customer the motor drive warranty is not voided by improper programming?

2.5 The easy and safe way out

The difficulty of providing these requirements by programming or electrical interlocking was recognized early. Specialist switch manufacturers have provided special interlocked switches from the beginning.
Since 1970, ELERO has supplied special electronic controllers to take care of these requirements and to protect the motor drive and the customer warranty.
ELERO has over 15 specialist motor controllers (interfaces) available that can be perfectly interfaced with the C-bus or any other automation system!

The benefit of an ELERO interface?
No matter how damaging the switching signals to the motor would be, with an ELERO interface between, the motor will always be controlled with the correct motor requirements and there is no chance of damaging the motor or voiding the customers warranty!

3.1 C-bus setup

All the programming you need to do on the relays controlling the motor is to set the C-bus signal to "Bell press"

3.2 C-bus Connection

No need to use the switch over relays. Simply use 2 normally open dry contacts per switched group or motor. Provide a closing relay for up, another one for down with one common.
The power supply for the interface is built into the interface and does not need to be provided by the automation system or external power supplies.
DIN rail mounted controllers are available for best possible access.

3.3 Motor grouping options

If you need to control several motors as a group, you will need only one pair of C-bus relays.
All elero interfaces can be connected to an unlimited quantity of further interfaces (even mixing of types ProLine, WKS and REG).
Individual motors still can have their individual power supply/ circuit breaker if required!

ELERO interfacing is available also as Plug and play with one or more inputs for any number of motors.
I.e. one installation in Germany has 1 Master input that operates 120 elero controllers in parallel!

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3.4 C-bus taking control over elero controllers

Easy: all interfaces from elero work very similar:
- Close up circuit for up direction
- Close down circuit for down direction
- Close up and down circuit for stop signal

3.5 Controlling examples

On example the VarioTec-915 controller at default setup you would get the following features without further programming of C-bus or elero controllers:

- A 2 sec. signal length will run the motor all the way up or down
- A less than 2 sec. signal will provide a tilting function for Venetians or inching function for roller blinds and awnings
- A "double click" allows running to a default tilt or intermediate position (timer based)
- A Signal in opposite direction will stop the motor while it is running
- A Signal in up and down direction simultaneously will stop the motor
- Power to the motor is automatically switched off after 3 minutes as a safety feature
- 2 Independent low voltage inputs are provided to create groups or to connect standard push buttons for low cost operation points
- 1 Input can be switched off by the end user by a simple slide switch on the controller (i.e. to avoid automatic operation while cleaning the windows)
- Inputs can be parallel wired to create groups (Group controllers are also available)
- Integrated operation buttons on the controller to check motor functions or use as operation location
- Built in radio receiver to easily add wireless hand held, wall mount, timer, sun sensors, etc

4.1 Contact us for more information:

Documents for C-bus integration without elero controllers:	“Clipsal doc, C-Bus direct to motors 1of 3.pdf” “Clipsal doc, C-Bus direct to motors 2of 3.pdf” “Clipsal doc, C-Bus direct to motors 1of 3(Main).pdf”
Available C-bus integration elero controllers:	“C-bus to elero controller page 1.pdf”
Connection examples elero to C-bus:	“C-bus to elero controller page 2.pdf”
Pictures of Plug & Play interface with radio receiver:	“plug & play radio remote for cbus interfacing.pdf”
Short version of this document showing connection example:	“Basic bmcs requirements.pdf”

Additional controller functions and sensors can be used to extend the C-bus systems with sun, wind, rain, temperature sensor. Weekly timer with built in Longitude/ Latitude setting for exact sunrise and set times throughout the year for every location in the world, including automatic switch over between daylight saving time!
Contact us with your specific requirements

5.0 About ELERO:

elero (electrical roller!) is a German manufacturer specialized in manufacturing tubular motors and many other motor types and controls for the Shading, Shutter & Door industries since 1964. The subsidiary elero Australia provides sales & technical support and warehousing for a wide range of motor drive & control products.

Technical support in Australia & New Zealand is provided by the Technical Sales Manager, Markus Werner. With 8+ years motorization industry experience including the a motorization project integrating 1600 roller blind motors with individual visualization and control via PC and full automation via timer and 24 Sun sensors and many individual switching points.
More info: www.elero.com or www.elero.com.au

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