
USER GUIDE
Concens C4-CON-xW
Actuator controller for up to 4 actuators



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2. Introduction

The Concens C4 series is a range of battery-based actuator controllers developed especially for mobile applications. The controller can manage up to 4 actuators with a wired handset and it is supplied by either a NiMH Li-Ion-battery.

The controller may be configured using PC software which may be ordered separately from Concens. This allows patterns of operation, stroke length, speed, etc. for the connected actuators to be adjusted.

Symbols used:



Attention: Consult accompanying documents

3. Technical data and model designation

Input voltage: 24VDC
 Operating temperature: 5°C to 40°C
 Relative humidity: 20% to 70%
 Atmospheric pressure: 1atm
 Max. operating altitude: 2000m
 Battery technology: NiMH or Li-Ion

Model designation and label:

C4-CON-1W-000-000000: Controller for one actuator
 C4-CON-2W-000-000000: Controller for two actuators
 C4-CON-3W-000-000000: Controller for three actuators
 C4-CON-4W-000-000000: Controller for four actuators



4. Preparation

Before the system may be used, the battery must be charged using the accompanying charger. It takes 5-8 hours to fully charge a battery.



Battery mounted in charger

The yellow LED lights up when the charger is connected to power. Place the battery in the charger by sliding it in and rotating it until it is pulled into place by the magnets. The green LED will flash at approx. 1 second intervals while the battery is being charged. Once charging is complete the green LED remains permanently lit. Remove the battery by rotating it 90 degrees. It will then be ejected and be ready for use.

Once the battery is fully charged, insert it into the controller. Follow the same procedure as for the charger. If everything is OK, the controller will simply sound a beep (one second) once the battery is in place. If the system has any faults, the beep will be followed by an error indication according to table 1 below.



Battery, controller and remote control



Battery mounted in the controller – ready for use

When the battery requires recharging, transfer it to the charger as described above. It is recommended that you keep an extra battery on hand to avoid disruption to operation.

Always wait at least two seconds after the last actuator has stopped moving before removing the battery. Otherwise the controller may not have time to store the position and it may be necessary to perform 0-point calibration as described in section 5.

5. Normal operation

During normal operation the actuator is driven in an out using the appropriate buttons on the remote control. Situations may arise which require a particular action. These situations are described below.

Low battery level

If the battery level goes below a warning level while operating the actuators, **three short buzzer tones** are sounded. This means that the battery requires recharging, and the actuators can therefore only be driven in one direction (normally in).

Flat battery

If the battery level goes below a minimum level while operating the actuators, **one short buzzer tone** is sounded. The actuators will stop immediately and the controller will shut down. The battery must be charged. You must wait at least one minute before inserting a new battery into the controller. If you are using actuators with position feedback (hall effect), you will need to perform 0-point calibration. See below.

Extreme battery load

The battery may become too hot if it is subject to extreme load due to repeated operations in rapid succession, thereby activating the battery's safety thermostat. The controller will shut down and the battery must be allowed to cool for at least half an hour before being used again. You must wait at least one minute before inserting a different battery into the controller. If you are using actuators with position feedback (hall effect), you will need to perform 0-point calibration. See below.

0-point calibration

If you use actuators with position feedback (hall effect), you will need to perform 0-point calibration on the controller so that the innermost position of the actuators can be recorded. This must be done for all actuators which use position feedback. The controller will sound **two short buzzer tones** following the beep when the battery is inserted if 0-point calibration is required.

It is also possible to initiate manual 0-point calibration by holding in the relevant 'in' buttons for 10 seconds. The controller sounds a beep followed by **2 long buzzer tones** and 0-point calibration can be performed by pressing the 'in' button and holding it so that the given actuator(s) is/are driven in. Hold down the button until the actuators have been driven fully in. The controller has now been 0-point calibrated and the system may be used normally. The actuators can only be driven in during 0-point calibration.

Table 1 below shows all of the C4 controller's status indications:

Name	Description	Conditions	Buzzer	Red LED	Green LED	Handset LED	Comments
Startup	Confirm battery OK	Battery voltage >Level3	1 med	1 med	1 med	1 med	OK
Low Battery Shutdown	Shutdown	Battery voltage <Level1					No operation
Low Battery Warning	Min. level during operation	Battery Voltage <Level 2	3 short	3 short		3 short	Stops, can only drive in
Low Battery Warning	Low battery during standby	Battery Voltage <Level2	1 short	1 short		1 short	Only repeated for every 30 seconds
Low Battery Warning	Low battery at startup	Battery Voltage <Level3	5 short	5 short		5 short	Not possible
Current limiter activated	Current limit exceed for one output	Current limit exceeded for 10ms?	1 long	1 long	Channel number: 1-4 short	1 long	Relevant output disabled
Hall Pulse Lost	Hall pulse missing from one sensor	No pulse from hall sensor for 1 sec.	2 long	2 long	Channel number: 1-4 short	2 long	Relevant output disabled
Calibration Required	Synchronized outputs need to be calibrated	Initially and after power failure	2 short	2 short	2 short	2 short	Synchronized outputs can only drive in
Calibration OK	Calibration procedure completed	Calibration procedure completed			1 long		
Calibration Failed	Calibration procedure failed	Calibration procedure failed	2 long	1 short	1 short	1 short	
Max Total Current	Max total current for controller achieved	Current for output 1+2+3+4 > TotalMaxCurrent	3 long	3 long	3 long	3 long	No operation
Sleep Mode					1 short		

Table 1: Controller status indications

- All signals are repeated for every 10 seconds as long as the conditions are fulfilled unless specified otherwise
- Battery alarms are reset after power recycle
- Timing of signals: Short = 0,2 sec; Med = 1 sec; Long = 2 secs.

6. Tips

It is recommended that you follow the tips below to achieve the best results and avoid problems in daily operation.

General:

- Always wait at least two seconds after the last actuator has stopped before removing the battery from the controller. Otherwise controllers using position feedback may not have time to store the position, and the controller will have to be 0-point calibrated again.
- If the battery's safety thermostat is activated due to overload, the battery must be allowed to cool for at least half an hour before being used again. A new battery may be inserted into the controller after one minute.
- If two or more actuators which operate in parallel become misaligned, the controller will automatically shut them down. It will then be necessary to perform 0-point calibration again as described in section 5.

Batteries:

- Always use batteries which are in good condition and fully charged when inserted into the controller.
- You can extend the lifetime of the battery by occasionally recharging it even though it is not fully discharged.
- If the battery level drops below the critical level and the system shuts down, you must wait at least one minute before inserting a different battery and using the system again.
- If the system is not to be used for an extended period (several days or weeks), the battery should be removed from the controller to avoid deep discharge, which can cause lasting damage to it.

Handling:

- Avoid getting metal shavings or other magnetic objects on the battery poles or in the controller.

7. Troubleshooting

If problems or irregularities arise you should go through the points below (in consultation with a technician where appropriate).

- Check that all connectors are correctly attached to the controller.
- Check that the controller sounds a beep when the battery is inserted.
- If the actuators cannot be operated, perform a 0-point calibration as explained in section 5.

If none of the above resolves the problem, please contact the supplier.