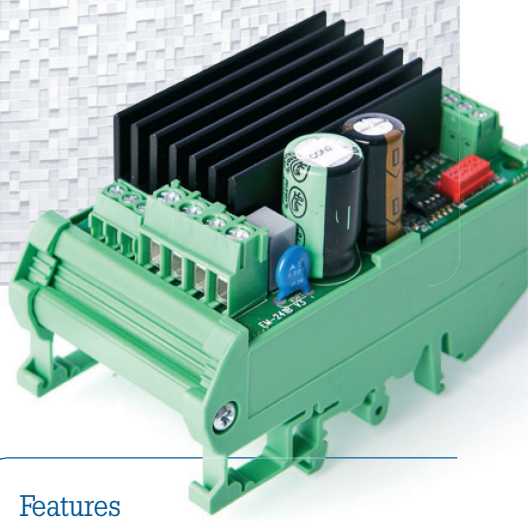
GB

DATA SHEET

C2-20

Advanced Actuator Controller

concens
- excellent electric actuators



C2-20

The C2-20 actuator controller provides advanced positioning and control of actuators through easy and flexible integration with the application. The controller is designed to work with Concens electrical in-line actuators in applications where positioning is required. C2-20 has adjustable acceleration and deceleration ramps, which make smooth starts and stops possible.

Adjustable current limits in both directions protect the motor against overcurrent. In learning mode the number of hall pulses in a full stroke of the actuator is counted which enables accurate positioning during normal operation.

The position of the actuator is controlled by a DC voltage between 0-5 or 0-10 Volts to the C2-20. Adjustments and parameter settings like current limit value, ramp times, speed etc. are set with C2-PROG interface unit or C2-USB "dongle" connected to a PC.

Features

- Precise position control from analog voltage input
- Soft start and soft stop
- Settable current limit
- High efficiency
- High momentary load capacity
- DIN-rail base fittable
- "Position reached" - signal

Technical Data

Supply voltage	10-35VDC
Ripple	Less than 20%
Actuator current continuous max	15A (Ta<60°C)
Actuator current max	20A (short time)
Current limit adj.	0.1-20A
Overheat limit	100°C
PWM frequency	2kHz
Hall input freq.	Max 1kHz
Input control logic (pos.)	High=4-30V, Low=0-1V or open
Control input impedances typ.	30kohm
Motor and supply connectors	2.5mm wires max
Control connectors	1mm wires max
Dimensions	73x43x25mm (LxWxH)
Weight	75g
Operating temp (Ta)	–20 to +70°C
Idle current	45mA

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FIG. 1 WIRING FOR C2-20

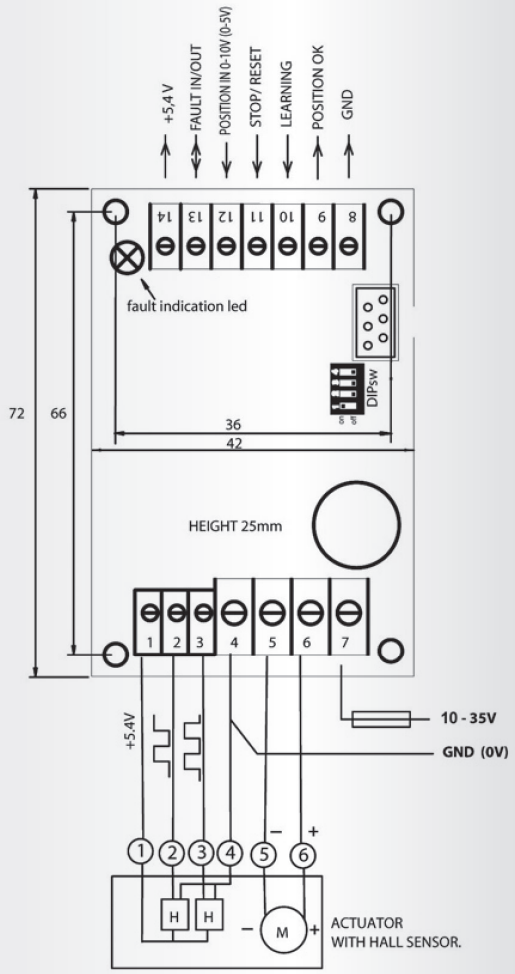
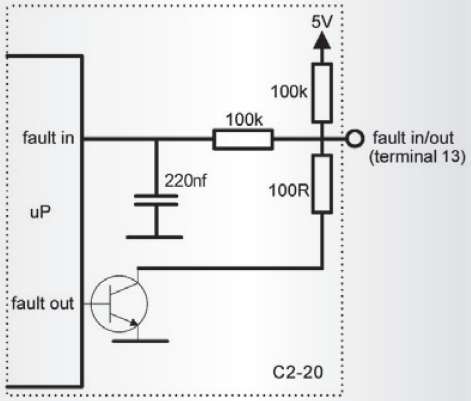


FIG. 2 CIRCUIT DIAGRAM



TERMINALS

1 **Supply for hall sensors** (+5V output)

2 **Hall channel A**

3 **Hall channel B**

4 **GND (0V)**

5 **Actuator –**

6 **Actuator +**

7 **Supply** 10–35 VDC (Use fuse)

8 **GND (0V)**

9 **Position OK**
Digital output 5V through 1kohm when wanted position is reached and low during travel.

Note: If "Brake Zone" is very long, then POSITION OK signal can be difficult to reach, since the motor only gets very low power to reach within the "dead zone"

10 **Learning**
Digital input (>4V and max supply voltage) starts "learning". Rin 47k

11 **Stop/Reset**
Digital input (>4V and max supply voltage) Stops the motor and resets any fault. Rin 47k

12 **Pos. Set**
Analog input 0-10V (0-5V if SW1 on 4 pole SW is OFF), Rin 30k

13 **Fault IN/OUT**
NPN open collector max 100mA can be connected to other C2-20 modules, thereby all modules connected will stop if one module sends a FAULT signal. If wire length is more than 1 meter, a 10kohm pull-up resistor connected to supply is recommended. Diagram in FIG 2

14 **+5,4V** output, max 10mA

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WIRING AND SETTINGS

First run the learning cycle and then do the settings with serial interface unit "C2-PROG" or PC. *Default values in* ( )

1/15 Speed: 35 - 100% <=> 35-100 (100)

2/15 Learning speed: 35 - 100% <=> 35-100 (50)

3/15 I-limit "forward": 0,1 - 20,0A <=> 1-200 (20)

4/15 I-limit "reverse": 0,1 - 20,0A <=> 1-200 (20)

Notice! Current limits are 1.5 times higher during **start ramp** and 1 sec. thereafter

5/15 I-trip enable: 0/1 <=> off/on (1)

6/15 I-trip delay: 0 - 255ms <=> 0 - 255 (5)

7/15 Load compensation: 0 -255 <=> 0 - 255 (0)

8/15 Pulse lost timeout: 1 - 5s <=> 1 - 5 (2)

9/15 Start value: 0 - 50% <=> 0 - 50 (30)

10/15 Hour/Start count reset: 0 - 1, reset when set to 1

11/15 Brake area: 0,0 - 20,0% <=> 0 - 200 (50)

12/15 Dead zone: 0,0 - 10,0% <=> 0 - 100 (10)

13/15 Range scale in: + 0,0 - 50,0% <=> 0 - 500 (7)

14/15 Range scale out: - 0,0 - 50,0% <=> 0 - 500 (70)

15/15 Start ramp: 0,1 - 5s <=> 0 - 500 (100)

FIG. 3 POSITIONING WINDOW

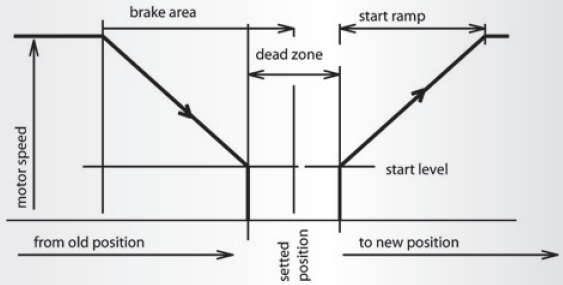
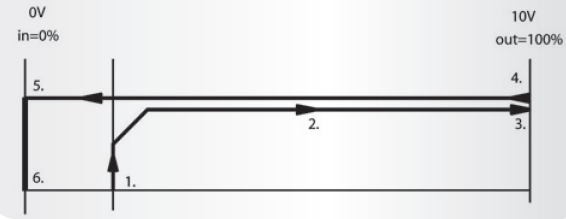
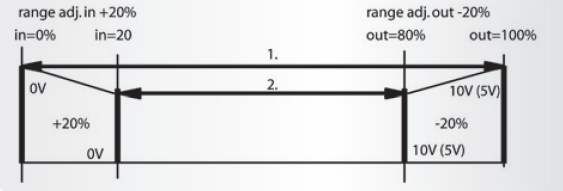


FIG. 4 LEARNING CYCLE



1. Start learning by giving an impulse to learn input (10)
2. Motor starts to run "out" direction with learn speed
3. Current limit stops the motor when mechanical end is reached
4. Motor starts to "in" direction and makes a full stroke. During stroke the pulse counter measures the range.
5. Motor reaches the mechanical end "in", and current limit stops the motor.
6. Device stores full range value and is ready for use

FIG. 5 RANGE SCALING



1. Original learned range = mechanical full range equals the signal range 0-10V (0-5V)
2. Modified range example:
   If range scale in = +20% and
   range scale out = -20%.
   now stroke of actuator is compressed to:
   positioning set value 0V = 20% position
   positioning set value 10V (5V) = 80% position

- **Speed** limits the maximum speed.
- **Learning speed** sets the learning cycle speed. (FIG. 4)
- **I-limits** are individual for reverse and forward directions.
- **I-trip** enables the trip function, so that motor will be shut down when the set I-limit is exceeded. Motor has to be started in opposite direction after trip.
- **I-trip delay** defines the reaction time for trip.
- **Load compensation** increases the torque at low speed. Note that over-compensation will cause oscillation and twiching of the motor.
- **Pulse lost timeout** stops motor after the set time without pulses.
- **Start value** is a voltage level for start (% of full), this ensures that the motor gets an adequate voltage to start properly, but note that too high start level will cause motor vibration (FIG. 3).
- **Brake area** (soft-stop) is proportional value of the full stroke. In low speed application good value is near 1%, and in high speed solution it can be near to 20% (FIG. 3).
- **Dead zone** is steady area, suitable size of this zone depends on the mechanical accuracy of the system, this value is also a ratio of the full stroke (%) (FIG. 3).
- **Hour/Start** count reset makes possible to set the hour/start counter to zero.
- **Range scale** adjustment is for scaling of the stroke, with this the scale can be adjusted after learning. The reverse and forward ends are individually scaleable to get the suitable mechanical stroke for set value from 0-10V (0-5V) (FIG. 5).
- **Start ramp** (soft-start) defines the time before reaching full speed.

STATUS LED SIGNALS

1. Fast blinking = Stopped due to current limiter active
2. Slow blinking = Overtemperature
3. Short, mid, long... = Hall pulse lost
4. 4x fast blinking (burst), pause = Overvoltage
5. 2x short, 1x long = Fault in
6. LED permanent on = Learning not completed, new learning required

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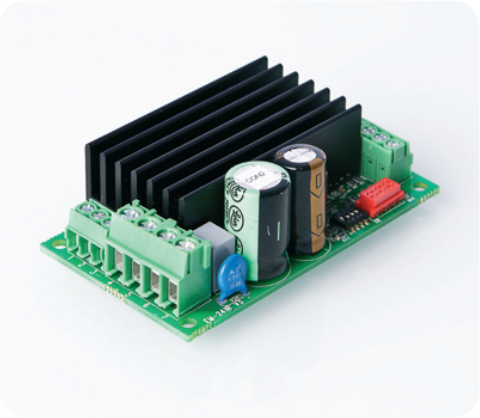
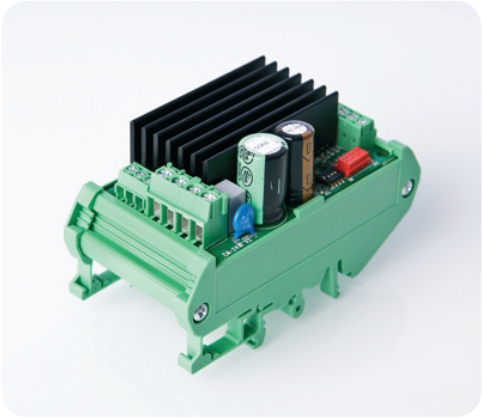


C2-20-PCB-000-000000 (board alone)
73 x 43 x 25 mm (L x W x H)



C2-20-DIN-000-000000 (DIN rail version)
90 x 46 x 56 mm (L x W x H)

C2-20-BOX-000-000000 (box version)
102 x 73 x 47 mm (L x W x H)

C2-USB Programming Cable for PC
and **C2-PROG** Programming Unit

Warnings and recommendations

- If C2-20 goes into "trip" (overcurrent) it is only possible to run actuator in opposite direction.
- Please adjust the max. current to be 10% higher than maximum current during load.
  This ensures the longest actuator lifetime.
- Please ensure that the power supply for the controller is capable of supplying sufficient current – otherwise the controller and the actuator may be damaged.
- Doublecheck correct polarity of power supply. If connected wrong the C2-20 will be damaged.
- Attention! C2-20 has no fuse in it. Use external fuse according to application (2 → 10A slow).
- Concens does not have any responsibility over the possible errors in this data sheet.
- Specifications are to be changed without notice.

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