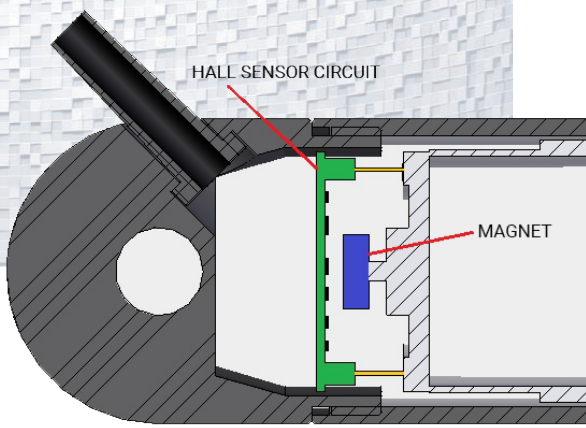
GB

DATA SHEET

Hall Sensor

Option for con35, con50 and con60



Hall Sensor Option

The hall sensor option is available for all three Concens actuator models. The hall sensor enables control of the position of the piston rod very precisely. Furthermore, the hall option allows driving of two or more actuators synchronously, depending on the choice of controller. A combination of the above features is also possible.

The circuit board is fully backwards compatible with earlier versions. Previous versions have a limited supply voltage range.

Electrical Data

Supply voltage: 5 - 24 VDC (± 10 %) for all actuators

Current consumption: 5 - 20 mA depending on supply voltage (Current consumption when using Concens controllers with 5 VDC power supply for hall circuit is approx. 5 mA).

Output: 5 - 24 V amplitude depending on supply voltage, 90 ° or ¼ cycle delay between output A and B. Output is "open collector" - type with internal 10 kΩ pull-up resistors. Concens controllers are equipped with pull-up resistors (4,7 kΩ - 10 kΩ).

Certified: according to IEC60601-1, ANSI/AAMI/ES60601-1, CAN/CSA-22.2 No60601-1 available (24 VDC actuators only).

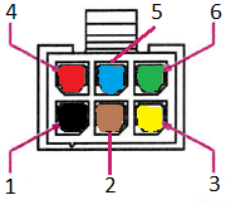
Build in dimension BID:	con35 – BID increased by 10 mm con50/60 – BID increased by 15 mm
Cable:	con35 – 1 m, 2 x AWG20 +4 x AWG26, Ø = 4.85 mm, black jacket, bending radius is 6 x Ø con50/con60 – 1 m, 2 x AWG16 +4 x AWG26, Ø = 6.35 mm, black jacket, bending radius 6 x Ø
Concens control unit:	C1, C2-20, C2-30, C3 and C4
Customer control unit:	PLC or similar

Electrical Wiring *Fig. 1*

con35/con50/con60 with standard Concens cable					
Yellow	Green	Brown	Blue	Red	Black
Hall A output	Hall B output	5–24 V DC supply for hall	0 V GND for hall	Actuator +	Actuator -

The table above shows the standard Concens cable for all three models. If other color combinations are experienced, please ask for advice or scan QR code for further information, before connecting actuator to the controller.

Fig. 2



Pin 1: Actuator - black
Pin 2: Hall supply brown
Pin 3: Hall output ch A yellow
Pin 4: Actuator + red
Pin 5: Hall GND blue
Pin 6: Hall output ch B green

Looking at the connector from opposite side of the cable

Hall Resolution

In the tables below hall resolution is calculated for con35/50/60. Also note the formulas for calculating number of pulses in a full stroke.

con35/100 mm/pitch 2

		C1 - C3 - C4			C2-20 - C2-30		
Gear ratio	Exact Gearing	Pulses	Pulses/mm	mm/pulse	Pulses	Pulses/mm	mm/pulse
1:5	1:5 2/11	259	2.59	0.386	1036	10.36	0.096
1:14	1:13 11/15	687	6.87	0.146	2747	27.47	0.036
1:19	1:19 13/64	960	9.60	0.104	3841	38.41	0.026
1:27	1:26 63/74	1343	13.43	0.074	5370	53.70	0.019
1:51	1:50 17/19	2545	25.45	0.039	10179	101.79	0.009
1:71	1:71 15/91	3558	35.58	0.028	14233	142.33	0.007

con50/100 mm/pitch 3

		C1 - C3 - C4			C2-20 - C2-30		
Gear ratio	Exact Gearing	Pulses	Pulses/mm	mm/pulse	Pulses	Pulses/mm	mm/pulse
1:4	1:4	133	1.33	0.750	533	5.33	0.188
1:14	1:14	467	4.67	0.214	1867	18.67	0.054
1:17	1:17 1/3	578	5.78	0.173	2311	23.11	0.043
1:24	1:24	800	8.00	0.125	3200	32.00	0.031
1:49	1:49	1633	16.33	0.061	6533	65.33	0.015
1:84	1:84	2800	28.00	0.036	11200	112.00	0.009

con60/100 mm/pitch 4

		C1 - C3 - C4			C2-20 - C2-30		
Gear ratio	Exact Gearing	Pulses	Pulses/mm	mm/pulse	Pulses	Pulses/mm	mm/pulse
1:19	1:18 7/9	469	4.69	0.213	1878	18.78	0.053
1:43	1:42 7/8	1072	10.72	0.093	4288	42.88	0.023
1:66	1:65 13/18	1643	16.43	0.061	6572	65.72	0.015
1:81	1:81 10/27	2034	20.34	0.049	8137	81.37	0.012
1:100	1:100 2/7	2507	25.07	0.040	10029	100.29	0.001

Fig. 3

C1, C3 and C4:

$$\frac{gearing \times stroke}{pitch} = pulses\ (full\ stroke)$$

Example:

Stroke length: 60 mm Gearing: 1:84 Pitch: 3

$$\frac{84 \times 60\ mm}{3} = 1680 \rightarrow 28\ p/mm$$

Fig. 4

C2-20 and C2-30:

$$\frac{gearing \times stroke \times 4}{pitch} = pulses\ (full\ stroke)$$

Example:

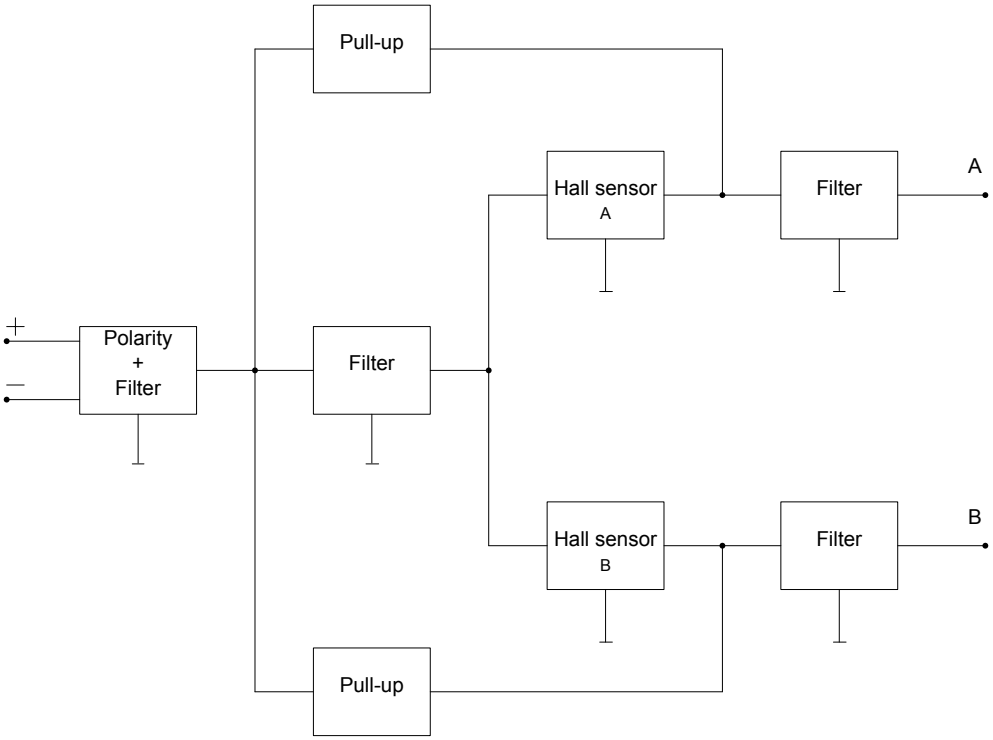
Stroke length: 60 mm Gearing: 1:84 Pitch: 3

$$\frac{84 \times 60\ mm \times 4}{3} = 6720 \rightarrow 112\ p/mm$$

Hall Sensor Option

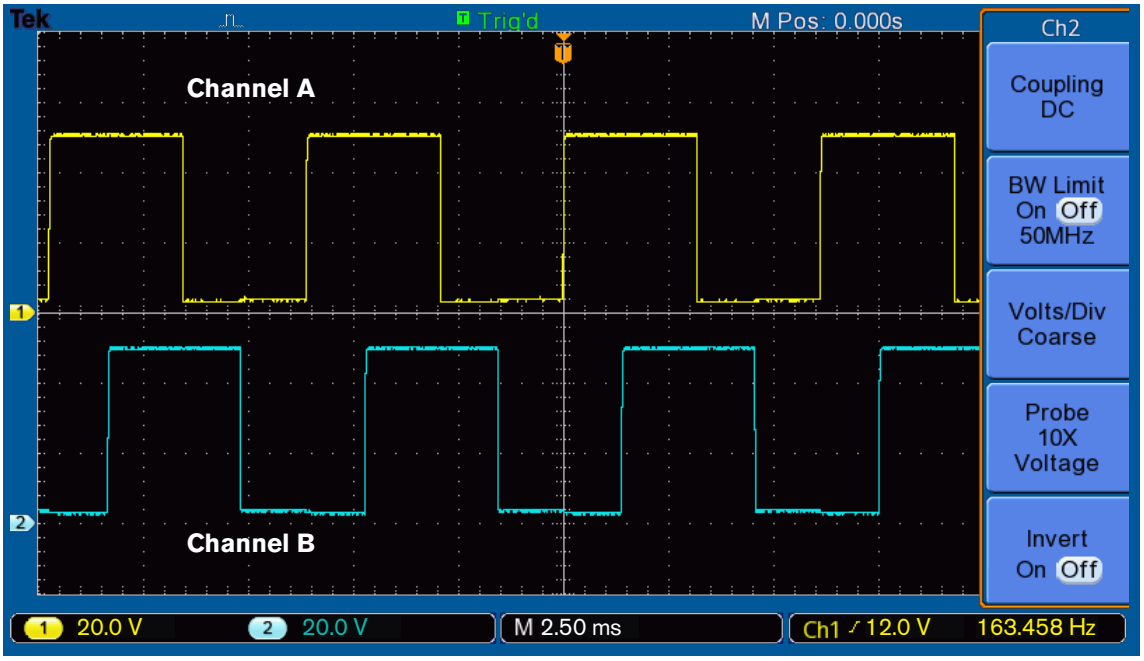
Hall Sensor Circuit Block Diagram *Fig. 5*

The hall circuit inside the actuator has four connections. Two connections for power supply and two for output signals. The hall sensor works with supply voltage from 5 - 24 VDC (+/- 10 %). The outputs, A and B, each provide a square wave signal with ¼ cycle or 90 ˚ delay between them. The amplitude of the output corresponds to the supply voltage (power supply 5 VDC => output is 5 V_{pp}/power supply 24 VDC => output is 24 V_{pp}). The output are "open collector"-type with internal pull-up resistors (10 kΩ).



Hall Pulse Waveform *Fig. 6*

This screen print of the output of the hall circuit shows the square wave with ¼ cycle or 90 ˚ delay between them.



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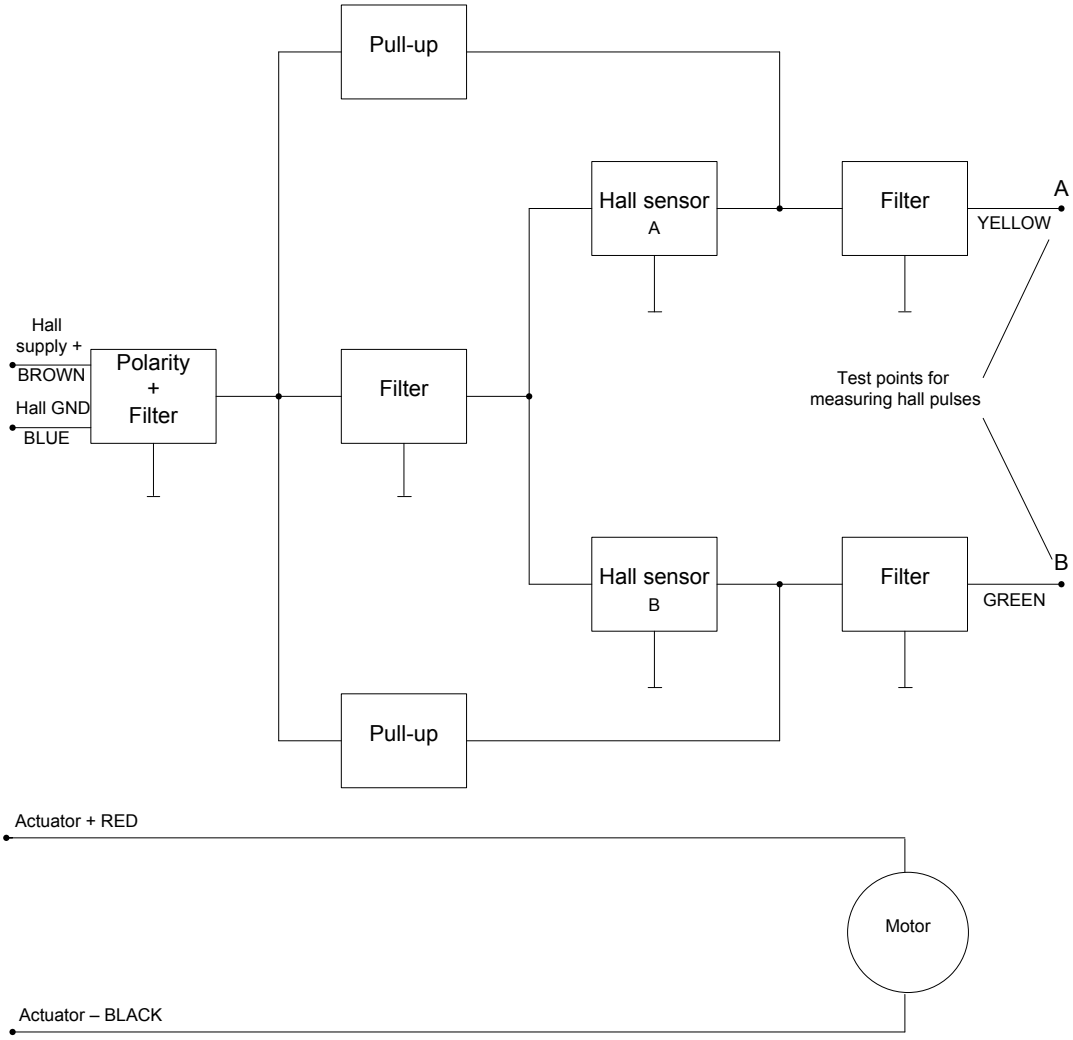
Hall Test *Fig. 7*

Supply motor with 24 VDC to the motor wires(red and black)
Supply hall with + 5 VDC to the brown wire and 0 V (GND) to the blue wire
Now measure the signal from each hall output
It should be a square signal with 5 V_{pp} amplitude as shown in fig. 6



Recommendations and warnings

- When using actuators with hall sensor option, calibration or learning cycle must be performed before system is ready for use.
- Electrical noise from the environment where the actuators are used may disturb the hall signal. These disturbances are usually increased by longer cable lengths.

Disclaimer

- Concens products are continuously developed, built and tested for highest requirements and reliability but it is always the responsibility of the customer to validate and test the suitability of our products in a given application and environment. Concens products must not be used in safety critical applications.
- We do our utmost to provide accurate and up-to-date information at all times. In spite of that, Concens cannot be held responsible for any errors in the documentation. Specifications are subject to change without prior notice.

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