

Speed Controller

2-Quadrant PWM
configurable via PC

For combination with:
DC-Micromotors and
Brushless DC-Servomotors

Series SC 2402

		SC 2402 P	
Power supply for electronic	U _p	5 ... 24	V DC
Power supply for motor	U _{mot}	0 ... 24	V DC
Max. continuous output current ¹⁾	I _{dauer}	2	A
Max. peak output current	I _{max}	4	A
Total standby current	I _{el max}	0,03	A
Input/output (partially free configurable)		5	
Weight		14	g
PWM switching frequency	f _{PWM}	96 (24)	kHz
Efficiency	η	95	%
Speed range:			
– BL motors with Hall sensors (digital)		500 ... 100 000	rpm
– BL motors with Hall sensors (analog)		50 ... 60 000	rpm
– BL motors with digital Hall + encoder		50 ... 30 000	rpm
– DC motors with encoder		100 ... 30 000	rpm
Scanning rate		500	μs
Resolution of encoder with DC motors		≤ 65 535	inc./rev.
Operating temperature range		– 25 ... + 60	°C
Storage temperature		– 25 ... + 85	°C

¹⁾ at 22°C ambient temperature

Versions


Speed Controller	Option	Motor Type	Version			Part No.
			Sensor Type	Set speed value specification ¹⁾	Speed at U _{nsoll} = 10 V	
SC 2402 P	3530	BL	Hall sensors (digital) ³⁾	0 ... 10 V	20 000 rpm	6500.01381
SC 2402 P	3531	DC	Incremental encoder ²⁾	0 ... 10 V	10 000 rpm	6500.01392
SC 2402 P	3980	BL	Absolute encoder	0 ... 10 V	20 000 rpm	6500.01439
SC 2402 P	4289	BL	Hall sensors (analog) ³⁾	0 ... 10 V	20 000 rpm	6500.01474
SC 2402 P	4475	BL	Digital Hall + encoder ³⁾	0 ... 10 V	20 000 rpm	6500.01520
SC 2402 P	4476	BL	Digital Hall + brake/enable ³⁾	0 ... 10 V	20 000 rpm	6500.01522

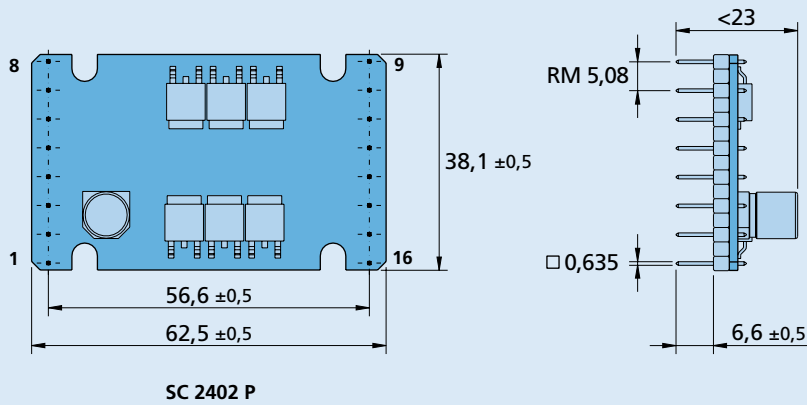
¹⁾ The velocity range can be configured by software. Versions with PWM and other configurations are available on request.

²⁾ preset value is 512 lines.

³⁾ Factory pre-configured for 2 pole motors. For operation with 4 pole motors the speed controller must be reconfigured with the software "Faulhaber Motion Manager".

Dimensional drawing and connection information SC 2402 P

 Scale reduced



Connection

Pin	Function
1	U _p
2	U _{mot}
3	GND
4	U _{nsoll}
5	DIR
6	FG
7	IO 2
8	IO 1
9	Mot C
10	Mot B
11	Mot A
12	SGND
13	V _{cc}
14	Sens C
15	Sens B
16	Sens A

SC Function

Description of connections (Motor-dependent)

	DC-Motors with Encoder	BL-Motors with Hall sensors	BL-Motors with Absolute encoder	BL-Motors with digital Hall sensors + encoder	BL-Motors with digital Hall sensors + brake/enable
Connection "Mot A", "Mot B", "Mot C":					
- Motor connection	Mot +	Phase A	Phase A	Phase A	Phase A
	Mot B	Phase B	Phase B	Phase B	Phase B
	Mot C	Phase C	Phase C	Phase C	Phase C
Connection "Sens A", "Sens B", "Sens C":					
- Sensor input	<i>reserved</i>	Hall sensor A	DATA	Hall sensor A	Hall sensor A
	encoder canal A	Hall sensor B	CS	Hall sensor B	Hall sensor B
	encoder canal B	Hall sensor C	CLK	Hall sensor C	Hall sensor C
	$f \leq 400 \text{ kHz}$				
Connection "IO1", "IO2"					
- logic input	<i>reserved</i>	<i>reserved</i>	<i>reserved</i>	encoder B	brake
	<i>reserved</i>	<i>reserved</i>	<i>reserved</i>	encoder A	enable

Connection information (general)

Connection "Up":	Up	power supply electronic
Connection "U_{mot}":	U _{mot}	power supply motor coil
Connection "GND":		ground
Connection "U_{nsoll}":	U _{in} = 0 ... 10 V / > 10 V ... max. U _p ¹⁾	(standard version)
- analog input	set speed value	motor stops
	U _{in} < 0,15 V	motor starts
	U _{in} > 0,3 V (0,5 V) ²⁾	
- digital input	PWM for set speed value	motor stopped
	duty cycle	half of maximum speed
		maximum speed
	input resistance	
	signal level PLC	high
		low
	signal level TTL ³⁾	high
		low
Connection "DIR":		
- digital input	direction of rotation	counterclockwise
		clockwise
	input resistance	
Connection "FG":		
- fault output		open collector with pull-up resistor ⁴⁾
- frequency output (BL motor only)		no error
		lines per revolution
Connection "IO1", "IO2":	n.c.	<i>reserved</i>
- digital input ⁶⁾		
	signal level TTL	high
		low
	(IO2)	motor enabled
		motor disabled
	(IO1)	motor stopped
		motor run
Connection "V_{cc}":		
output voltage	5 V DC	for external use
max. output current for	SC 1801 S, F, P	» I _{cc} = 25 mA
	SC 2402 P	» I _{cc} = 20 mA
	SC 2804 S	» I _{cc} = 30 mA
	SC 5004 P	» I _{cc} = 100 mA
	SC 5008 S	» I _{cc} = 100 mA
Connection "SGND":		signal ground

¹⁾ > 10 V for set speed value not defined.

²⁾ Data in parentheses apply to BL motors operating without sensors.

³⁾ Not available for SC 5004 / SC 5008

⁴⁾ 22 kΩ (SC 1801, SC 2402, SC 2804)

47 kΩ (SC 5004, SC 5008)

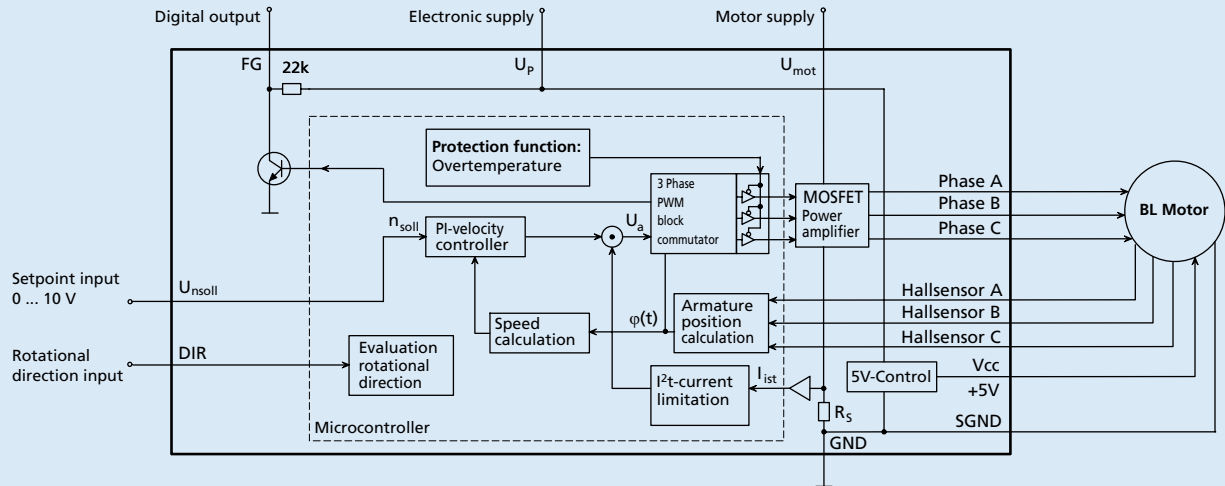
An additional external pull-up resistor can be added to improve the rise time.

Caution: I_{out} max. 15 mA must not be exceeded.

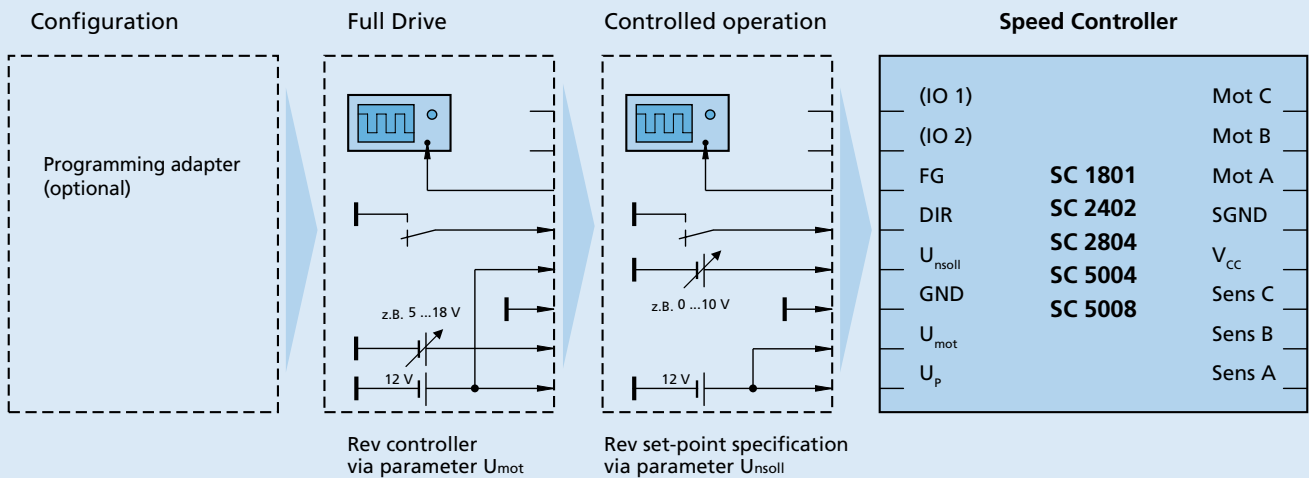
⁵⁾ Values apply to 2-pole motors. The given values double for 4-pole motors.

⁶⁾ With appropriate hardware.

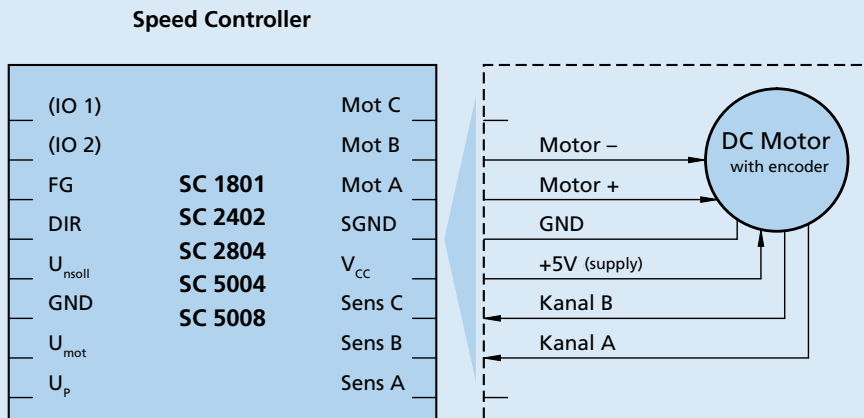
Circuit diagram - brushless with Hall sensors (Option 3530)



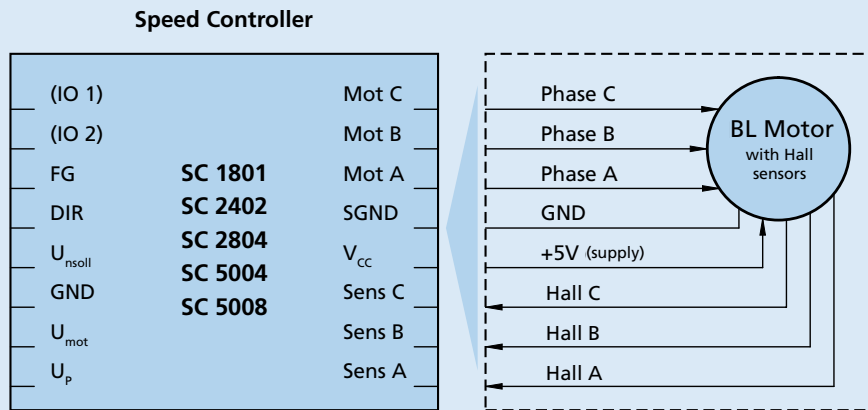
Connection diagram supply unit



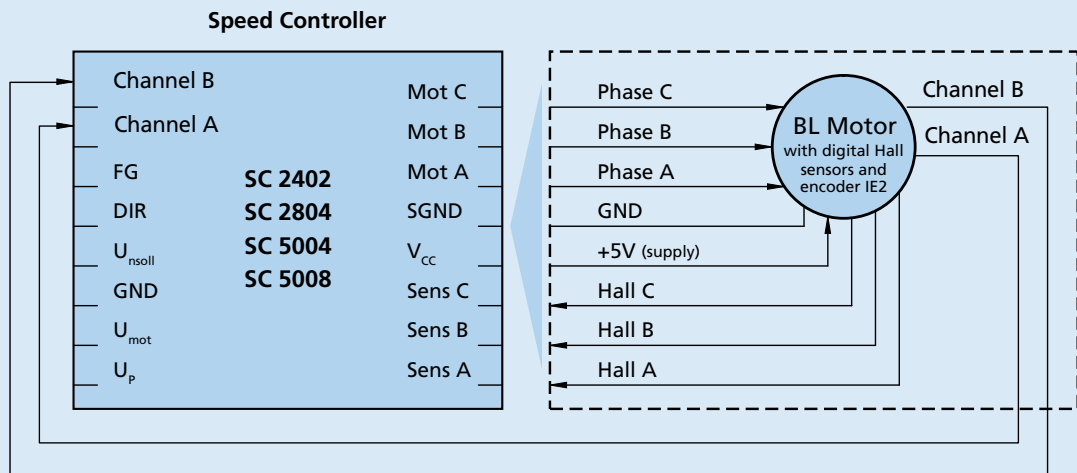
Connection diagram operation mode DC-Micromotor with encoder



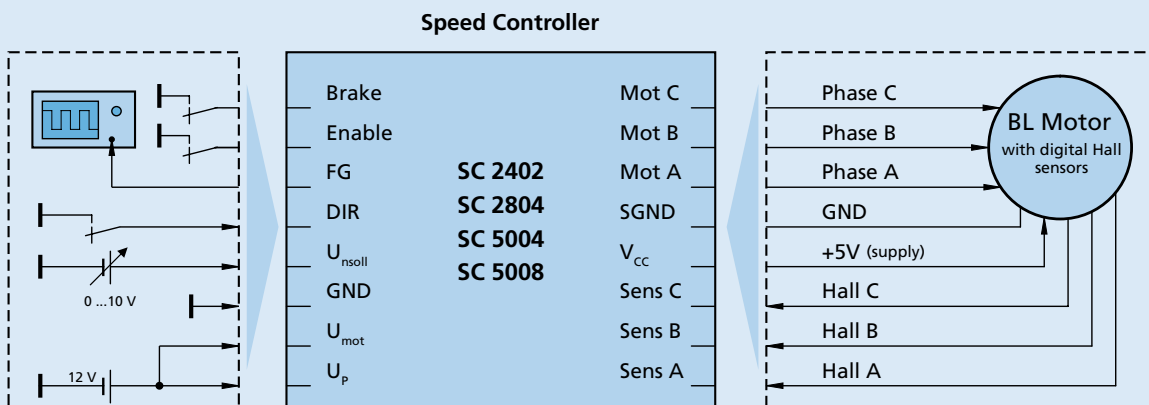
Connection diagram operation mode BL motor with Hall Sensors



Connection diagram operation mode BL motor with digital Hall Sensors and Encoder

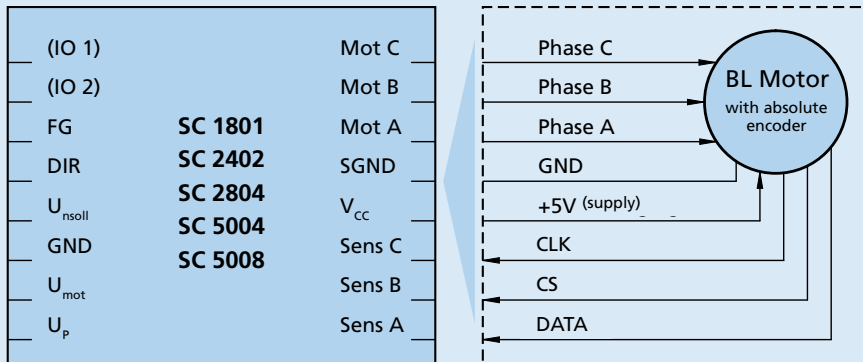


Connection diagram operation mode BL motor with digital Hall Sensors and Brake / Enable



Connection diagram operation mode BL motor with AES

Speed Controller



Connection diagram operation mode DC and BL motor sensorless

Speed Controller

