

NEW

Speed Controller

2-Quadrant PWM
configurable via PCFor combination with:
DC-Micromotors and
Brushless DC-Servomotors

Series SC 1801, SC 2804

		SC 1801 P	SC 1801 F	SC 1801 S	SC 2402 P	SC 2804 S	
Power supply for electronic	U _P	4,0 ... 18	4,0 ... 18	4,0 ... 18	5 ... 24	5 ... 28	V DC
Power supply for motor	U _{mot}	1,8 ... 18	1,8 ... 18	1,8 ... 18	0 ... 24	0 ... 28	V DC
Max. continuous output current ¹⁾	I _{dauer}	1	1	1	2	4	A
Max. peak output current	I _{max}	2	2	2	4	8	A
Total standby current	I _{el}	0,018	0,018	0,018	0,03	0,03	A
Input/output (partially free configurable)		3	3	3	5	5	
Conformity		-	CE	CE	-	CE	
Tightening torque, terminal strip		-	0,12 ... 0,15	0,12 ... 0,15	-	0,5 ... 0,6	Nm
Weight		4	10	12	14	160	g
PWM switching frequency	f _{PWM}	96 (24)					kHz
Efficiency	η	95					%
Speed range BL motors with Hall sensors		500 ... 100 000 ²⁾					rpm
Speed range DC motors with encoder		100 ... 30 000 ²⁾					rpm
Scanning rate		500					μs
Resolution of encoder with DC motors		≤ 65 535					lines/rev.
Operating temperature range		0 ... + 60					°C
Storage temperature		- 25 ... + 85					°C

¹⁾ at 22°C ambient temperature²⁾ speed depend on supply voltage, load, motor type and software.

Connection information (general)

Connection "U _P ":	U _P	power supply electronic
Connection "U _{mot} ":	U _{mot}	power supply motor coil
Connection "GND":		ground
Connection "U _{nsoll} ":		(standard version)
- analog input	set speed value	U _{in} = 0 ... 10 V / > 10 V ... max. U _P ³⁾
		U _{in} < 0,15 V
		U _{in} > 0,3 V (0,5 V) ⁴⁾
- digital input	PWM for set speed value	500 ... 18 000 Hz
	duty cycle	d = 0%
		d = 50%
		d = 100%
	input resistance	R _{in} ≥ 5 kΩ
	signal level PLC	7,5 ... U _B
		0 ... 2
	signal level TTL	2,8 ... U _B
		0 ... 0,5
Connection "DIR":		
- analog input	direction of rotation	to ground or level < 0,5 V
		level > 3,0 V
	input resistance	R _{in} ≥ 10 kΩ
Connection "FG":		
- fault output		max. U _P /15 mA
- frequency output (BL motor only)		switched through to GND
		1, 3, (6)
Connection "IO1", "IO2":		n.c.
Connection "V _{cc} ":		
	output voltage	5 V DC
	max. output current for	SC 1801 ... » I _{cc} = 25 mA
		SC 2402 P » I _{cc} = 20 mA
		SC 2804 S » I _{cc} = 30 mA
Connection "SGND":		signal ground

³⁾ > 10 V for set speed value not defined.⁴⁾ Data in parentheses apply to BL motors operating without sensors.⁵⁾ An additional external pull-up resistor can be added to improve the rise time.Caution: I_{out} max. 15 mA must not be exceeded.

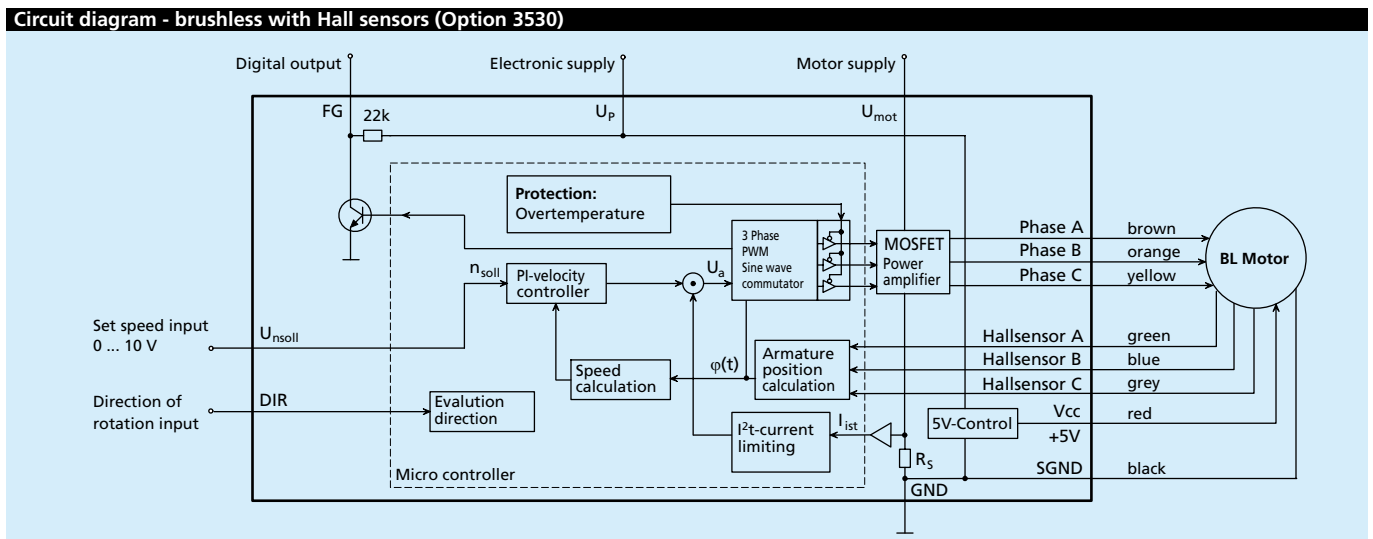
Description of connections (Motor-dependent)		DC motor	BL motor
Connection "Mot A", "Mot B", "Mot C":			
- Motor connection	Mot A	Mot +	Phase A
	Mot B	Mot -	Phase B
	Mot C	reserved	Phase C
Connection "Sens A", "Sens B", "Sens C":			
- Sensor input	Sens A	reserved	Hall sensor A
	Sens B	encoder canal A	Hall sensor B
	Sens C	encoder canal B	Hall sensor C
	f	≤ 400 kHz	

Ordering information Speed Controller							
Speed Controller	Option	Motor Type	Sensor Type	Version		Part No.	
				Set speed value specification ¹⁾	Speed at $U_{nsoll} = 10\text{ V}$		
SC 1801 S	3530	BL	Hall sensors (digital)	0 ... 10 V	30 000 rpm	6500.01377	
SC 1801 S	3531	DC	Incremental encoder ²⁾	0 ... 10 V	10 000 rpm	6500.01393	
SC 1801 F	3533	BL	sensorless (high speed)	0 ... 10 V	40 000 rpm	6500.01378	
SC 1801 P	3530	BL	Hall sensors (digital)	0 ... 10 V	30 000 rpm	6500.01379	
SC 1801 P	3531	DC	Incremental encoder ²⁾	0 ... 10 V	10 000 rpm	6500.01394	
SC 2804 S	3530	BL	Hall sensors (digital)	0 ... 10 V	20 000 rpm	6500.01390	
SC 2804 S	3531	DC	Incremental encoder ²⁾	0 ... 10 V	10 000 rpm	6500.01391	
SC 2402 P	3530	BL	Hall sensors (digital)	0 ... 10 V	20 000 rpm	6500.01381	
SC 2402 P	3531	DC	Incremental encoder ²⁾	0 ... 10 V	10 000 rpm	6500.01392	

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

Ordering information Accessories				
Accessories	Motor Type	for SC 1801 Part No.	für SC 2804 Part No.	
Programming adapter		6501.00088	6501.00088	
Motor connect. adapter	0620 ... B	6501.00083	-	
Encoder adapter	IE2	6501.00084	6501.00063	
	HEDS	6501.00001	6501.00001	
penny-motor adapter	BL	6501.00090	-	



Speed Controller

General description

The Speed Controllers SC 1801 P/F/S, SC 2402 P and SC 2804 S are suitable for both Brushless DC-Servomotors (BL motors) and DC Micromotors (DC motors). With a few exceptions, they cover the entire range of FAULHABER GROUP motors.

The SC 1801 Series is extremely compact and is suitable for even the smallest Faulhaber motors; the SC 2804 Series is the larger, more powerful variant.

Main features:

- The Speed Controllers are very flexible. With a programming adapter and the "FAULHABER Motion Manager" software, they can be freely configured by the customer.
- Depending on the configuration, either a BL motor or a DC motor with appropriate sensors for rotation speed measurement can be operated.
- The Speed Controllers are designed as velocity controller. Regulation is effected via a PI regulator.
- Operation without sensors is possible, the revs being determined by evaluating the retroactive generator voltage (EMC).
- Common to all the Speed Controllers is a current limiter that limits the maximum motor current in the case of excessive thermal loading. In the standard configuration, this current limiter is set at the factory to the maximum permitted value for the respective Speed Controller.

Standard variants

To allow prompt operability without programming adapter and software, the Speed Controllers are delivered in various standard variants. The variants of each type of controller listed in the Ordering notes can be flexibly reconfigured.

Configuration by the customer

All Controllers can be configured to one of the operating modes listed below, using a programming adapter and the "FAULHABER Motion Manager" software:

■ BL motors with digital Hall sensors

In the configuration of BL motors with digital Hall sensors, the motors are operated with controlled revs, the signals of the digital Hall sensors being used for switching and determining the actual revs.

■ BL motors without Hall sensors (operation without sensors)

In this configuration, no Hall sensors are used. Instead, the retroactive EMC of the motor is used for switching and for controlling the revs.

■ DC motors with encoders

In the configuration of DC motors with encoders, the motors are operated with controlled revs. An incremental decoder is required as an actual-revs transmitter.

■ DC motors without encoders

In the configuration of DC motors without sensors, the motors are operated with controlled revs, the actual-revs value being registered either via the retroactive generator voltage (EMC), or via IxR compensation, depending on the load. This type of operation must be tuned to the type of motor being used.

In addition to the above, further parameters can be altered using the "FAULHABER Motion Manager" software:

- Regulator parameters
- Output current limitation
- Fixed revs
- Encoder resolution
- Revs set-point specification via analog or PWM signal
- Maximum revs or speed range

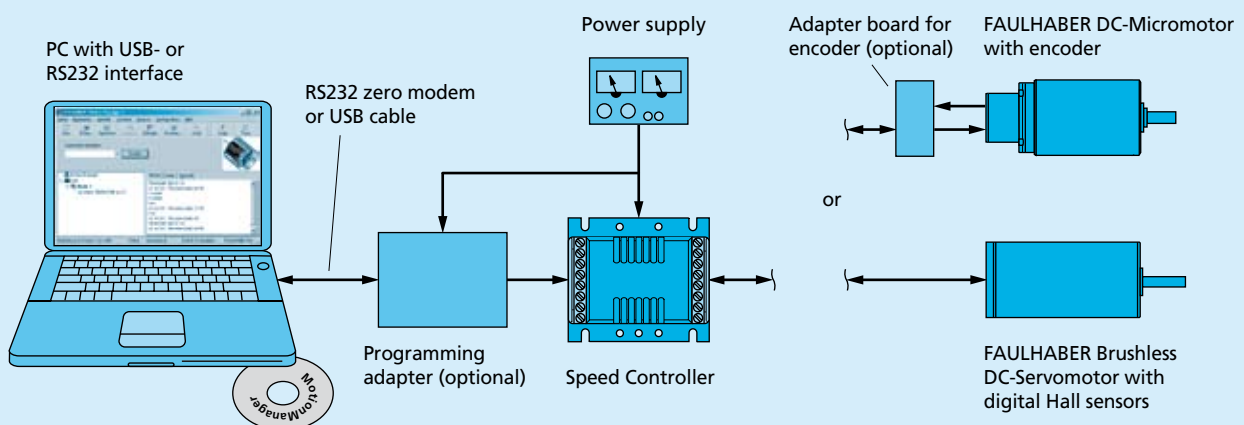
Areas of use

The low wiring effort and the compact construction of the Speed Controllers allows them to be used in a wide variety of applications. The flexible connection capabilities open up a wide area of use in all fields, for example in distributed automation-technology systems, handling and tooling machines, or pumps.

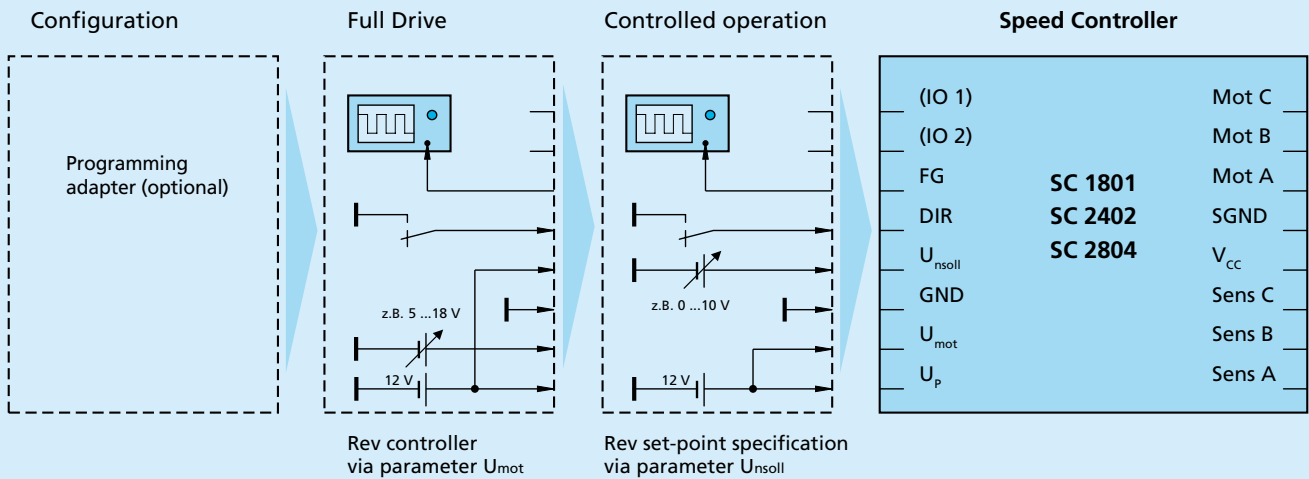
Note

Instruction manuals dealing with installation and commissioning of the Speed Controllers are included in delivery.

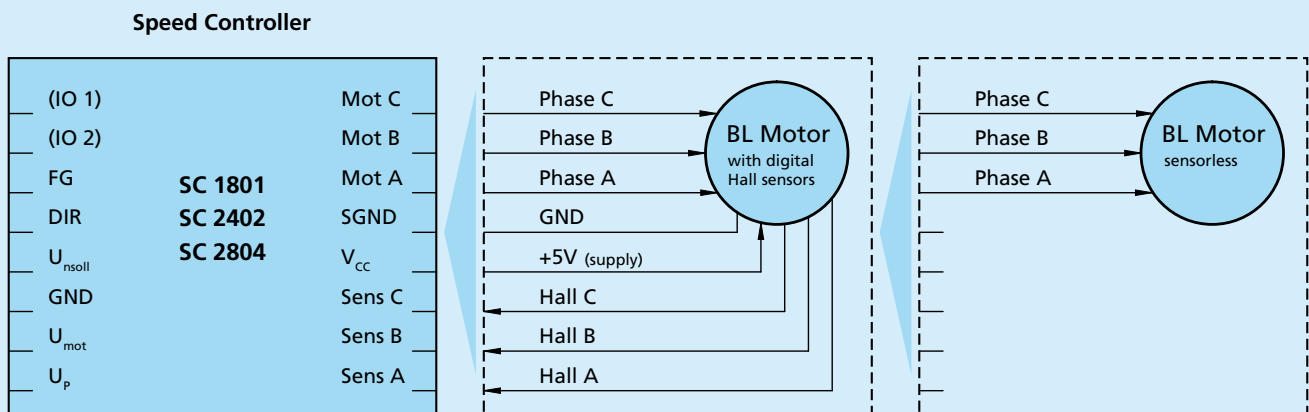
Connection diagram



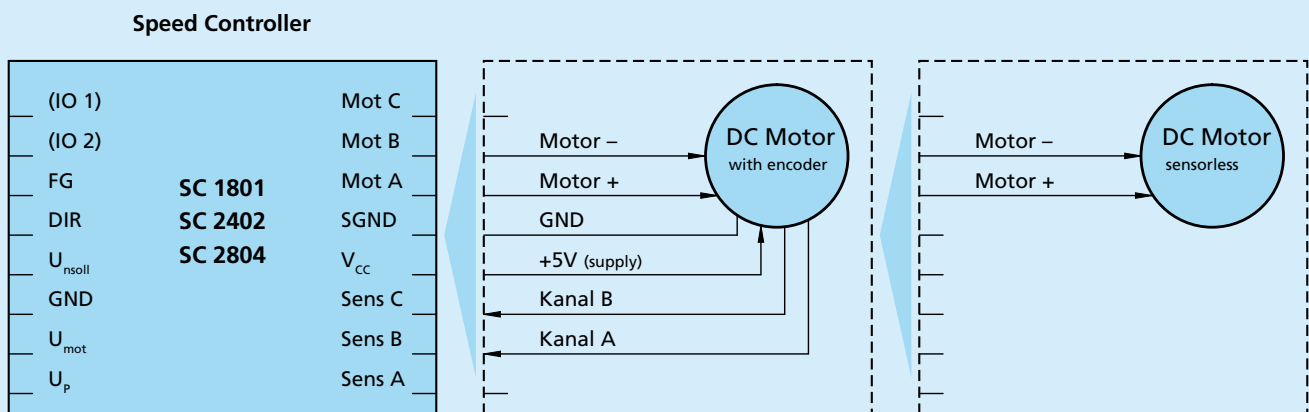
Connection diagram supply unit



Connection diagram operation modes BL motors

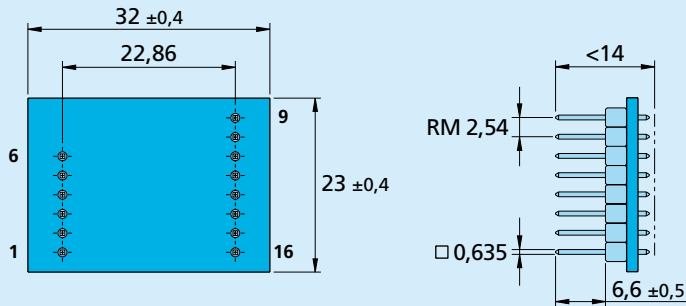


Connection diagram operation modes DC motors



Dimensional drawing and connection information SC 1801 P

M 1:1



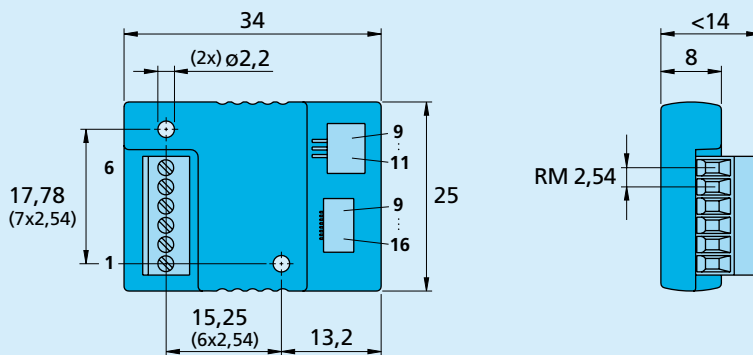
SC 1801 P

Connection

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

Dimensional drawing and connection information SC 1801 F

M 1:1



SC 1801 F

Connector Information

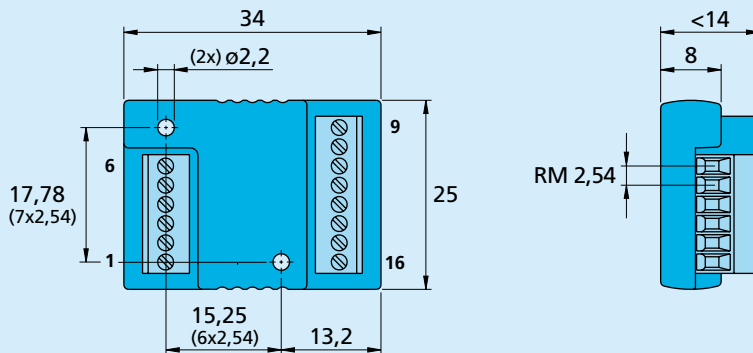
LIF-Connector
3-pole and 8-pole

Connection

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

Dimensional drawing and connection information SC 1801 S

M 1:1



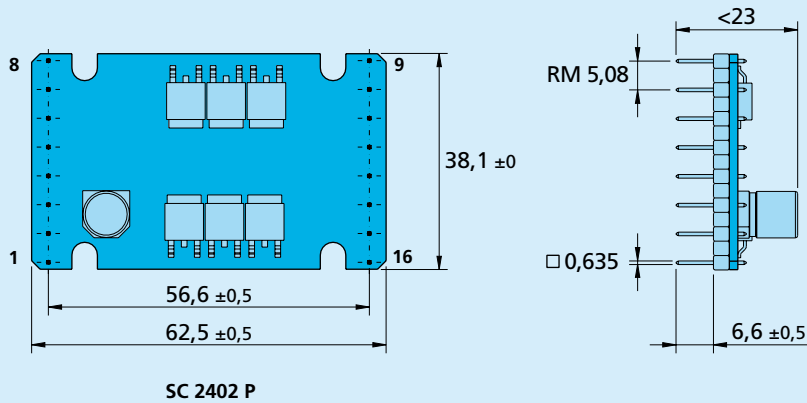
SC 1801 S

Connection

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

Dimensional drawing and connection information SC 2402 P

Scale reduced

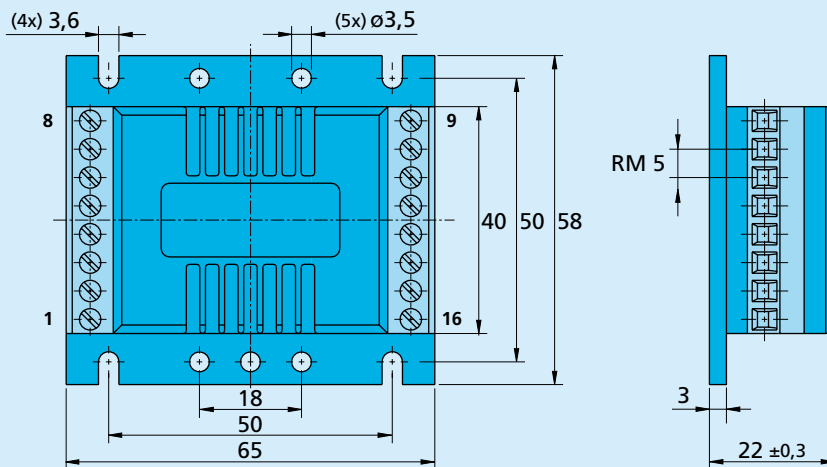


Connection

Pin	Function
1	Up
2	U _{mot}
3	GND
4	Un _{soll}
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

Dimensional drawing and connection information SC 2804 S

Scale reduced



Connection

Pin	Function
1	Up
2	U _{mot}
3	GND
4	Un _{soll}
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