

# Motion Controller

4-Quadrant PWM  
with CAN interface

For combination with:  
Brushless DC-Servomotors  
with option number K1155

## Series MCBL 3003/06 C

		MCBL 3003 C	MCBL 3006 C	
Power supply	U <sub>B</sub>	12 ... 30	12 ... 30	V DC
PWM switching frequency	f <sub>PWM</sub>	78,12	78,12	kHz
Efficiency	η	95	95	%
Max. continuous output current <sup>1)</sup>	I <sub>dauer</sub>	3	6	A
Max. peak output current	I <sub>max</sub>	10	10	A
Total standby current	I <sub>el</sub>	0,06	0,06	A
Speed range		5 ... 30 000	5 ... 30 000	rpm
Scanning rate	N	100	100	μs
Encoder resolution with Hall Sensors		≤ 3 000	≤ 3 000	lines/rev.
Resolution with external encoder		≤ 65 535	≤ 65 535	lines/rev.
Input/output (partially free configurable)		3	3	
Operating temperature range		0 ... + 70	0 ... + 70	°C
Storage temperature		- 25... + 85	- 25 ... + 85	°C
Housing material		without housing	aluminium, black anodized	
Weight		18	160	g

<sup>1)</sup> at 22°C ambient temperature

### Connection information

<b>Connection "CANH", "CANL":</b>			CAN-High / CAN-Low	
Interface			CAN	
Communication profile			CANopen	
Max. transfer speed rate			1	Mbit/s
<b>Connection "AGND":</b>				
– analog ground			analog GND	
– digital input external encoder			channel B	
	R <sub>In</sub>	10		kΩ
	f	≤ 400		kHz
<b>Connection "Fault":</b>				
– digital input		R <sub>In</sub>	100	kΩ
– digital output (open collector)		U	≤ U <sub>B</sub>	V
	I	≤ 30		mA
	clear		switched to GND	
	set		high-impedance	
	fault output	no error	switched to GND	
		error	high-impedance	
	signal output	f	≤ 2	kHz
	resolution		1...255	lines/rev.
<b>Connection "AnIn":</b>			"AGND" as GND	
– analog input set speed value		U <sub>In</sub>	± 10	V
– digital input PWM set speed value		f	100 ... 2 000	Hz
	T		50% ± 0 rpm	
	external encoder	f	channel A	
		f	≤ 400	kHz
	step frequency input	f	≤ 400	kHz
		R <sub>In</sub>	5	kΩ
<b>Connection "+24V":</b>		U <sub>B</sub>	12 ... 30	V DC
<b>Connection "GND":</b>			ground	
<b>Connection "3. In":</b>				
– digital input		R <sub>In</sub>	22	kΩ
– electronic supply voltage <sup>2)</sup>		U <sub>B</sub>	12 ... 30	V DC

<sup>2)</sup> Optional on request

### Connection information

Connection "Ph A", "Ph B", "Ph C":					
Motor connection	Ph A		Phase A	brown <sup>1)</sup>	
	Ph B		Phase B	orange <sup>1)</sup>	
	Ph C		Phase C	yellow <sup>1)</sup>	
		$U_{Out}$	$0 \dots U_B$		V
PWM switching frequency		$f_{PWM}$	7,8,12		kHz
Connection "Hall A", "Hall B", "Hall C":					
Hall sensor input	Hall A		Hall sensor A	green <sup>1)</sup>	
	Hall B		Hall sensor B	blue <sup>1)</sup>	
	Hall C		Hall sensor C	grey <sup>1)</sup>	
		$U_{In}$	$\leq 5$		V
Connection "SGND":					
Signal GND			Signal ground	black <sup>1)</sup>	
Connection "+5V":					
Output voltage for external use <sup>2)</sup>		$U_{Out}$	5	red <sup>1)</sup>	V DC
Load current		$I_{Out}$	$\leq 60$		mA

<sup>1)</sup> Color identification for brushless DC-Servomotor

<sup>2)</sup> E.g. Hall sensor

### D-SUB-connector information

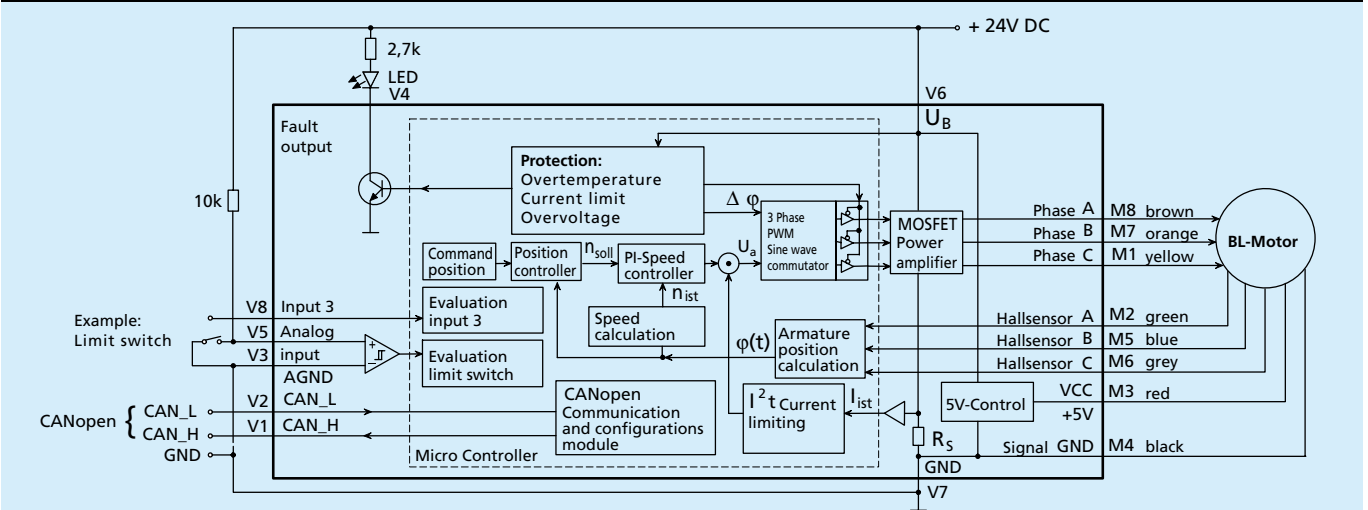
Connection D-SUB-connector:			
Pin 2	CAN_L		CAN-Low
Pin 3	GND		Ground
Pin 7	CAN_H		CAN-High

### Digital inputs general information

- PLC, default	high	$12,5 \dots U_B$	V
	low	$0 \dots 7$	V
- TTL	high	$3,5 \dots U_B$	V
	low	$0 \dots 0,5$	V

The signal level (PLC or TTL) of the digital inputs can be set over the interface (see instruction manual).

### Position control



Specifications subject to change without notice

## Motion Controller

### General description

The MCBL 3003/06 C is designed for brushless DC-Servomotors with linear Hall sensors. Ultra-low speeds and high positioning resolutions (1/3000 revolutions) are thus possible without the need for an additional encoder. The motors have a sinusoidal current, resulting in a constant torque over the entire circumference. This means that the motors run particularly quietly, and efficiency is also increased.

### Maximum performance:

- **PI speed controller** with superior performance specifications in respect of synchronous operation and minimal torque fluctuations.
- **Speed profiles** such as e.g. ramp, triangular or trapezoidal movements. More complex profiles can also be implemented.
- **Positioning** with high resolution, including **limit switches and zero referencing**.
- **Operation as torque controller** through current regulation.
- **Extended operating modes:**
  - Stepper motor mode
  - Gearing mode (electronic gear)
  - Analogue positioning mode (position control with analogue voltage)
  - Voltage regulator mode
  - Analogue target current presetting
  - External encoder to determine actual position

### Latest technology in micro format:

- High efficiency
- Power amplifier with very high PWM frequency
- Power MOSFETs with minimal on-resistance
- Unique thermal protection device determines MOSFET silicon temperature
- High-capacity 16 bit signal processor

### Versatile communication:

- **Set-point input** for speed presetting. Processes analogue and PWM signals. The input can also be used for a frequency or reference mark signal.
- **Error output** (Open Collector). Can also be programmed as a rotational direction or reference mark input.
- **Additional digital input**
- **CANopen interface** for integration into a CAN network with transfer rates up to 1Mbit/s

### Programming made easy

The MCBL 3003/06 C supports the CANopen communication profile according to DS301 V4.02 and DSP402 V2.0 in accordance with the CiA specification for slave devices with the following services:

- 1 Server SDO
- 3 Transmit PDOs, 3 Receive PDOs
- Static PDO Mapping
- NMT with Node Guarding
- Emergency Object

The transfer rate and node no. are set via the network in accordance with the LSS protocol according to DSP305 V1.11, and automatic baud rate detection is also implemented. In addition, all functions and parameters of the drive unit can be very easily activated via a special FAULHABER PDO channel. For each FAULHABER command a corresponding CAN message frame is available on the PDO channel, enabling the CAN unit to be operated analogously to the serial variant.

For Windows operating systems the **"FAULHABER Motion Manager"** software is available. This considerably simplifies operation and configuration and also enables graphic online analysis of the operating data.

### Fields of application

The Motion Controller can be used in many different areas. Thanks to the highly flexible connection options, this device is suitable for a diverse range of applications, for example in decentralised systems of automation technology, as well as in pick-and-place machines and machine tools.

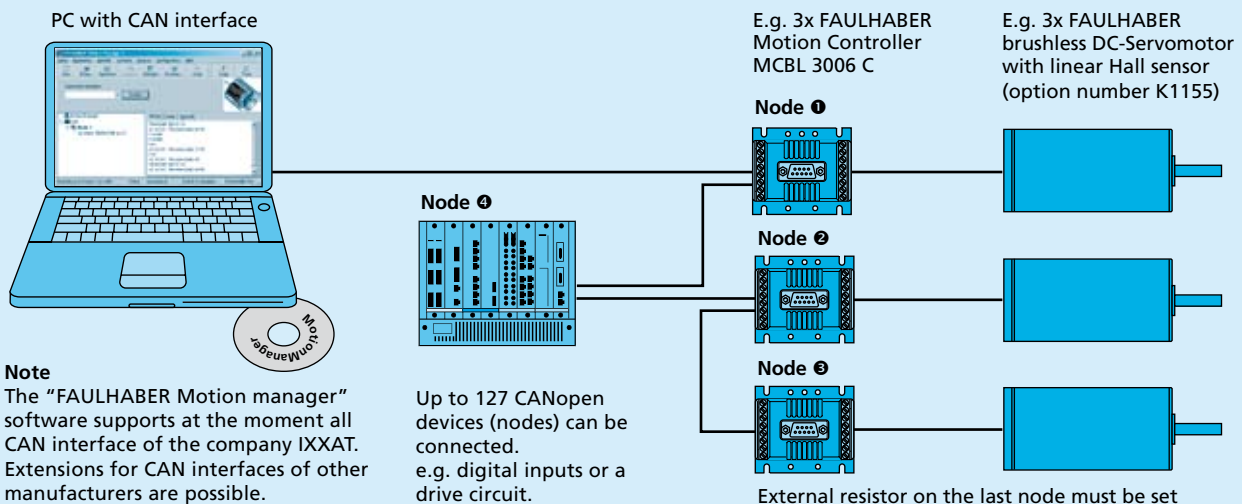
### Options

- Separate supply of motor and control electronics for safety-relevant applications is optionally available (Option no. - 3085); In this case the 3rd input is not available for digital signals.
- Special preconfiguration of modes and parameters is possible on request.
- The **"FAULHABER Motion Manager"** software is available on request or on the Internet.

### Note

A detailed instruction manual for installation and operation are provided with the Motion Manager.

## Connection diagram



Specifications subject to change without notice

### Ordering information

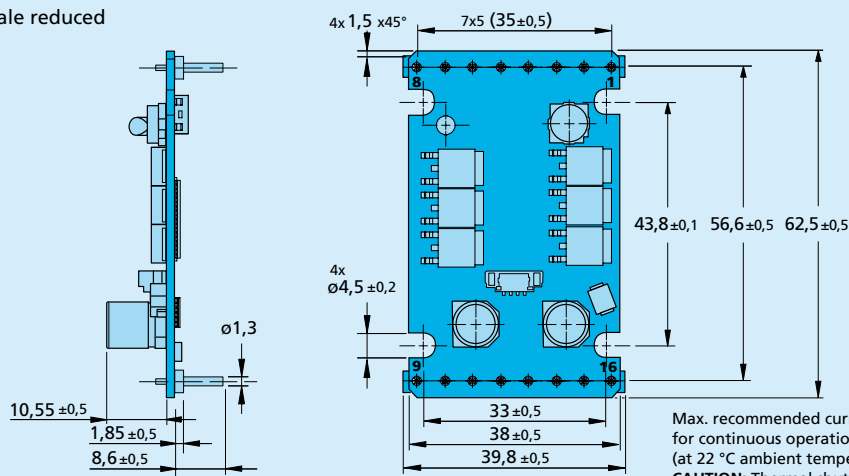
This Motion Controller is exclusively designed and tuned for the control of the listed brushless DC-Servomotors with option no. - K1155.

Option no. - K1155 indicates motors with linear Hall sensors for implementation with Motion Controller MCBL 3003/06.

- 1628 T ... B - K1155
- 2036 U ... B - K1155
- 2057 S ... B - K1155
- 2444 S ... B - K1155
- 3056 K ... B - K1155
- 3564 K ... B - K1155
- 4490 H ... B - K1155
- 4490 H ... BS - K1155

### Dimensional drawing and connection information for MCBL 3003 C

Scale reduced



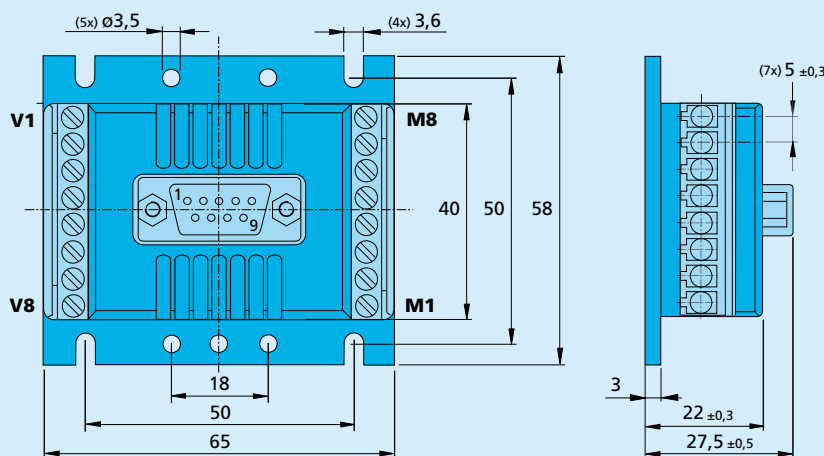
Max. recommended current for continuous operation: 3A (at 22 °C ambient temperature)  
CAUTION: Thermal shutdown is NOT guaranteed!

### Connection

Pin	Function
1	Ph C
2	Hall A
3	+ 5V
4	SGND
5	Hall B
6	Hall C
7	Ph B
8	Ph A
9	CAN_H
10	CAN_L
11	AGND
12	Fault
13	AnIn
14	+ 24V
15	GND
16	3. In

### Dimensional drawing and connection information for MCBL 3006 C

Scale reduced



### Motor connection

No.	Function
M1	Ph C
M2	Hall A
M3	+ 5V
M4	SGND
M5	Hall B
M6	Hall C
M7	Ph B
M8	Ph A

### Supply connection

No.	Function
V1	CAN_H
V2	CAN_L
V3	AGND
V4	Fault
V5	AnIn
V6	+ 24V
V7	GND
V8	3. In