Servo Amplifier
2-Quadrant PWM for Brushless DC-Servomotors

Series BLD 5018
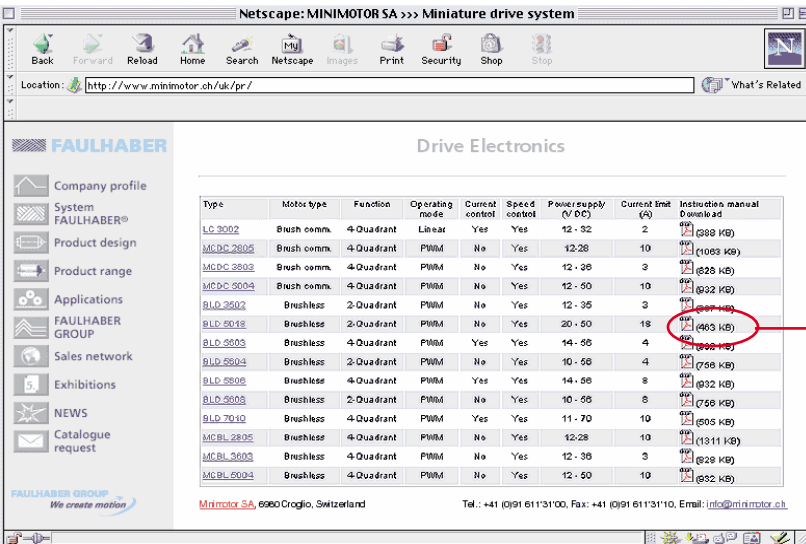

FAULHABER GROUP
We create motion

Operating Instructions
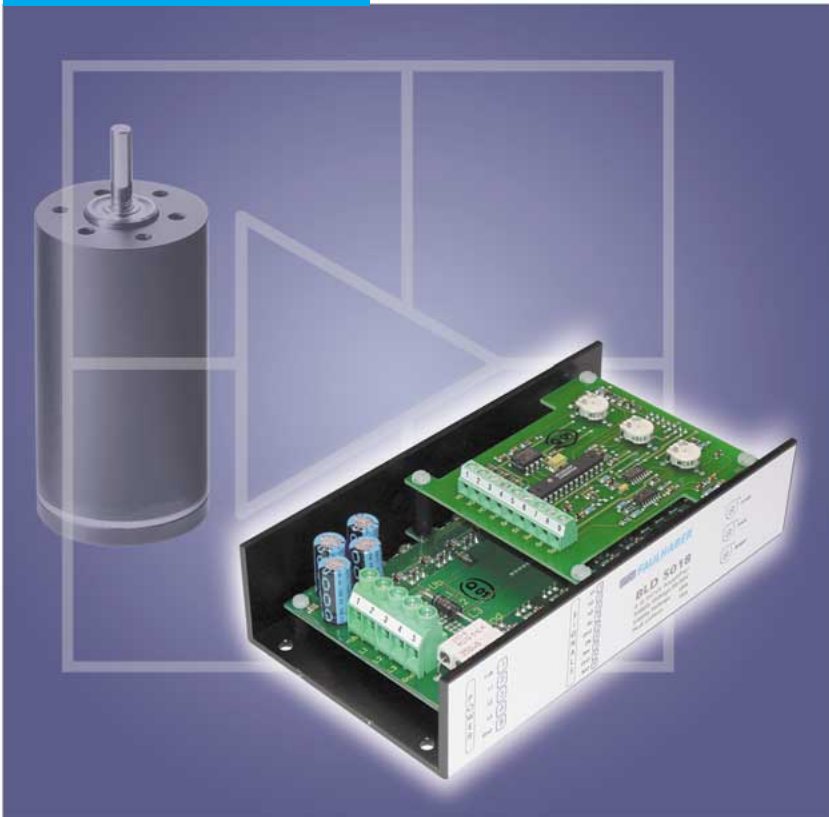
Miniature Drive Systems

Micro Drives
DC-Micromotors
Precision Gearheads
Servo Components
Drive Electronics

www.faulhaber.com

Surf to the following Internet address and you will find the latest edition of the instruction manual on-line :

www.minimotor.ch/uk/pr/

Netscape: MINIMOTOR SA >>> Miniature drive system

Back | Forward | Reload | Home | Search | Netscape | Images | Print | Security | Shop | Stop

Location: http://www.minimotor.ch/uk/pr/   What's Related

FAULHABER

- Company profile
- System FAULHABER®
- Product design
- Product range
- Applications
- FAULHABER GROUP
- Sales network
- Exhibitions
- NEWS
- Catalogue request

FAULHABER GROUP
We create motion

Drive Electronics

Type	Motor type	Function	Operating mode	Current control	Speed control	Power supply (V DC)	Current limit (A)	Instruction manual Download
LC 3002	Brush comm.	4-Quadrant	Linear	Yes	Yes	12 - 32	2	(388 KB)
MCDC 2805	Brush comm.	4-Quadrant	PWM	No	Yes	12-28	10	(1063 KB)
MCDC 3603	Brush comm.	4-Quadrant	PWM	No	Yes	12 - 36	3	(828 KB)
MCDC 5004	Brush comm.	4-Quadrant	PWM	No	Yes	12 - 50	10	(932 KB)
BLD 3502	Brushless	2-Quadrant	PWM	No	Yes	12 - 35	3	(897 KB)
BLD 5018	Brushless	4-Quadrant	PWM	No	Yes	20 - 50	18	(463 KB)
BLD 5603	Brushless	4-Quadrant	PWM	Yes	Yes	14 - 56	4	(992 KB)
BLD 5604	Brushless	2-Quadrant	PWM	No	Yes	10 - 56	4	(756 KB)
BLD 5606	Brushless	4-Quadrant	PWM	Yes	Yes	14 - 56	8	(932 KB)
BLD 5608	Brushless	2-Quadrant	PWM	No	Yes	10 - 56	8	(756 KB)
BLD 7010	Brushless	4-Quadrant	PWM	Yes	Yes	11 - 70	10	(505 KB)
MCBL 2805	Brushless	4-Quadrant	PWM	No	Yes	12-28	10	(1311 KB)
MCBL 3603	Brushless	4-Quadrant	PWM	No	Yes	12 - 36	3	(929 KB)
MCBL 5004	Brushless	4-Quadrant	PWM	No	Yes	12 - 50	10	(932 KB)

Minimotor SA, 6980 Croglio, Switzerland   Tel.: +41 (0)91 611'31'00, Fax: +41 (0)91 611'31'10, Email: info@minimotor.ch

For direct Download:

http://www.minimotor.ch/minicatalog/pdf/DriveCircuits/Manuals/IM_e_BLD_5018.pdf

Index

General information

1. Description

The devices of the construction line BLD 5018 are 2Q Servo amplifier with electronic commutation for three-phase brushless DC-Servomotors with Hall sensors which are arranged offset at 120°.

These Servo Amplifiers assess the rotor position over the integrated hallsensors.
The commutation logic controls a MOSFET power stage with high efficiency rate that supplies the specific part winding of the motor. A protection device against thermal overload is integrated.

The device can be attached nearby the motor due to the compact module construction line, the result is a better power tracking.

The adjustment of the speed set value and speed adaptation also for motor nominal current is to be set by internal potentiometers.
Control inputs for the motor turning direction and enable function are included.
The connection is by a robust screw terminal.

2. Illustration

Figure 1

Specifications subject to change without notice

Specification & dimensions

3. Specification	BLD 5018-SC2P	
Power supply	20 ÷ 50	V DC
Switching frequency	20	kHz
Continuous output current @ TA = 22°C	18	A
Analog input command: [1]		
– Voltage range	0 ÷ 5	V DC
Logic input	TTL	
Supply voltage for Hall sensors (max. 20 mA)	5	V DC
Maximum controllable speed [2]	12 000	rpm
Minimum controllable speed [3]	800	rpm
External inductance [4]	0 ÷ 300	µH
Temperature range:		
– Operating temperature	–10 ... + 45	°C
– Storage temperature	–40 ... + 85	°C

[1] Analog input command may be set by an external potentiometer or an external voltage.
[2] The maximum controllable speed depends on the power supply, the motor type and the load.
[3] The minimum controllable speed depends on the motor type and the load.
[4] The appropriate value depends on the operating cycle and working conditions.

4.   Dimensions and weight

Scale reduced

weight 360 g

Figure 2
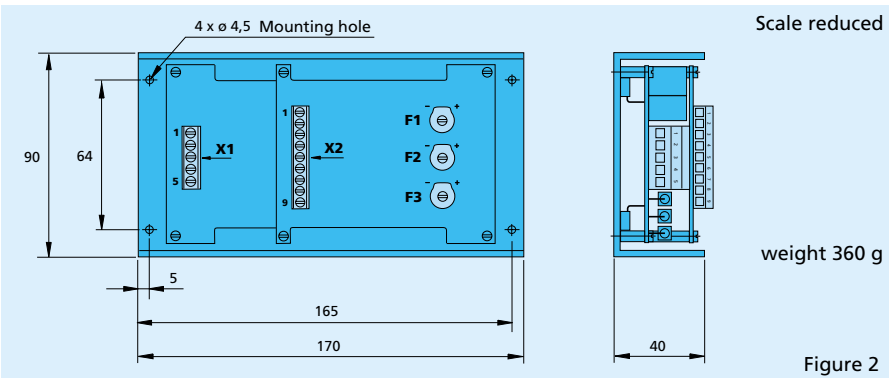
Safety notes and connection informations

5.   Safety notes

■ Operating voltages exceeding the specified values or reverse-connection will destroy the devices.

■ Unauthorised opening and improper repairs will put the user in danger.

■ If the module is brought from a cold environment into the operating environment, there can be condensation. Wait until the module has reached the right temperature and is absolutely dry before it is put into operation.

5.1 Connection informations

9-pin connector (signals)
Plug loading

Nr.	Printing	Description
1	H1	Hall sensor 1
2	H2	Hall sensor 2
3	H3	Hall sensor 3
4	UH	Supply voltage for Hall sensors
5	GND	Ground connection for Hall sensors
6	Dis	Control Input disable (free curcuit)
7	Rev	Control Input reverse (turning direction)
8	GND	Ground for control and set value input
9	Spd	Set value input for speed

5-pol connectors (power)

Nr.	Printing	Description
1	Ub	Supply voltage +
2	L1	Motorwinding 1
3	L2	Motorwinding 2
4	L3	Motorwinding 3
5	GND	Ground for supply voltage

Preparing

6. Preparing

6.1 Control input for turning direction (Rev)

The control input „**Rev**"is for changing the turning direction and can be controlled as following:

- **With external switch**
- **Open collector transistor**
- **With TTL/CMOS module**

"**Rev**"not connected or high level	"**Rev**"connected to **GND 8** or low level
Turning clockwise	Turning counter clockwise

Direction of rotation can be changed only when motor stopped.

6.2 Control input for disable (Dis)

The control input „**Dis**"is for disabling the unit and can be controlled as following:

- **With external switch**
- **Open collector transistor**
- **With TTL/CMOS module**

"**Dis**"not connected or high level	"**Dis**"connected to **GND 8** or low level
Motor is turning	Motor does not turn

Important notice:
For stopping the motor it is not advisable to make the set value to 0, but support this through disable. Some motors could otherwise drift shortly. This happens through the integral part of those controllers.

Preparing

6.3 Set value for speed

The set value for the speed can be preset like following:
6.3.1 By the means of the internal trimming potentiometer „**speed**"
6.3.2 By the means of an external potentiometer
6.3.3 By the means of external voltage

6.3.1 Set value with the internal trimming potentiometer „speed"

Short circuit between „**GND 8**" and „**Spd 9**".
Turn trimming potentiometer „**Speed**" to -: The speed is decreasing
Turn trimming potentiometer „**Speed**" to +: The speed is increasing

6.3.2 Set value with an external potentiometer

The built in trimming potentiometer „**Speed**" has to be positioned on – for this.
An external potentiometer with 10K is required. The potentiometer is to be connected as following:
Start: at „**UH4**"
End: at „**GND 8**"
wiper: at „**Spd 9**"

6.3.3 Set value with external voltage

The built in trimming potentiometer „**speed**" has to be positioned on –
The external set value is connected as following:
Set value **GND** to „**GND 8**"
Set value at „**Spd9**"

Set value voltage	Speed
= 0V	Stop
> 0,1V to about 4,5V	Speed according to set value voltage with speed control
> 4,5V to about 5V	Motor turns with maximum speed, according the supply voltage and is out of regulating range

6.4 Adjusting motor current (I_{max})

The current preset by trimming potentiometer „**I$_{max.}$**" as following:

Type	Maximum left position	Maximum right position
BLD 5018	6 -7 A	> 18A

6.5 Shut down at overheat

The controller shuts down automatically when the temperature at the inside of the heat sink exceeds 80°C .

Considerations and procedure

7.1 Considerations to put the device into operation

Please follow the sequence!

1. Connect Motor to **L1, L2** and **L3**

2. Connect Hall sensors **H1, H2, H3** as well as Hall sensor supply to **„UH4"** and **GND** to **„GND 5"** from Hall sensors.

3. Connect control inputs according to requirements.

4. Preadjust potentiometer (270°)·
   - At internal set value of the speed turn trimming potentiometer speed to – (short circuit between „GND 8" and „Spd")
   - At external set value of the speed turn trimming potentiometer speed to – and connect 0V to „Spd 9" against „GND 8".
   - Turn trimming potentiometer Imax. to +
   - Preadjust trimming potentiometer nmax. according to required maximum speed:
     +: max. speed
     -: min. speed

5. Connect supply voltage

6. Increase speed set value by Trimming potentiometer or by external set value.
   As long as the controller is in the active regulating range, the speed can be adjusted by trimming potentiometer speed at a constant external set value.

7. Adjust maximum current with trimming potentiometer **Imax.**
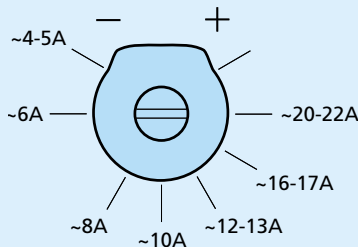
Potentiometer Imax.

Considerations and procedure

7.2 Considerations to power supply

Output voltage:
>12V und <Vcc with a residual voltage of <5%
Higher voltages will destroy device.

Output current:
Corresponding to the required torque and possible reserves for acceleration.

7.3 Procedure for calculating the required minimum supply voltage:

Default:
Operating moment: M_B [mNm]
Operating speed: n_B [min -1]
Rated voltage of motor: U_N [V]
Idling speed with U_N: n_0 [min -1]
Characteristic curve slope: $\frac{\Delta n}{\Delta M}$ [min -1 mNm]

Result:

$$Vcc = \frac{U_N}{n_0} \cdot \left(n_B + \frac{\Delta n}{\Delta M} \cdot M_B \right) + 4V$$

Specifications subject to change without notice

Assembly note

8.   Assembly note

■ Optimum heat dissipation is achieved by mounting the BLD 5018 module on a cooling surface and by the use of a thermal conduction paste.

■ For longer distances between the motor and the control (>30cm), shielded cables should be used for the sensor cable and the motor cable.

Specifications subject to change without notice

FAULHABER